THE

JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

[Registered as a Newspaper.]

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GAS PURIFICATION
BY
OXIDE OF IRON.

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Roofs, Girders, and Bridges, and General Smith's Wor
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"OTTO" GAS-ENGINE,
From ½ to 40 H.P. ind.
See Advertisement in last week's JOURNAL, page 6.
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GOLD MEDAL. HIGHEST AWARD.
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[*As Illustrated and Described in the* JOURNAL *for May* 4.]

Communications to be addressed to

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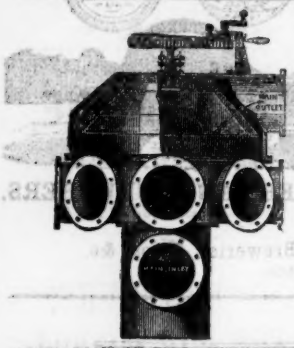
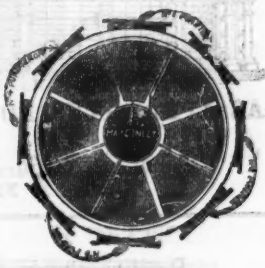
C. & W. WALKERS'
PATENT CENTRE-VALVES.



ELEVATION OF THE CENTRE-VALVE.

PLAN OF THE VALVE.



PLAN OF THE BODY.

These PATENT CENTRE-VALVES are the most perfect and certain means for working Purifiers on the system of three in action, and one out of action. The Valve itself is protected from all injury inside the safety cover. The working of the Valve is so easy, and so governed by the stop-catch movement, that the Purifiers can be instantaneously changed in the dark as well as in daylight. They are scraped perfectly true, metal to metal, the facings heretofore exposed are always covered, and there is nothing more reliable, certain, and durable in a gas-works. By their use the floor of the Purifying-house is clear and level; the Valve and all connexions being beneath the floor, out of the way of working. A considerable improvement and saving is effected in the cost of the connecting-pipes.

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HONOURABLE MENTION
HAVE BEEN AWARDED TO
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For their Various Exhibits, amongst which is a
SILVER MEDAL
FOR THEIR
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RETORTS AND FIRE-BRICKS,
Being the Highest Honour given for this class.

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SPECIAL NOTICE.—Our Patent Machine-Made Retorts have now been thoroughly tested, and have proved themselves infinitely superior to those made by hand. At several large works it has been settled, beyond question, that, owing to the compactness and general excellence, more gas is sent to the gasholder from each ton of coal carbonized than is the case with hand-made Retorts.

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AND
IMPROVED DRY GAS-METERS;
STATION-METERS OF ALL SIZES, with PLANED JOINTS;
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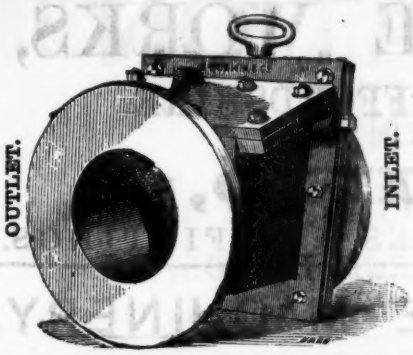
And all kinds of Experimental Gas Apparatus.



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Fitted with Knocker, so that the Valve can be easily opened by a handle should it stick.

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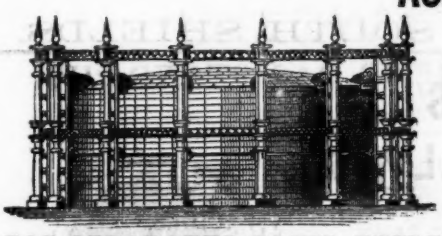

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HOPE IRON-WORKS,

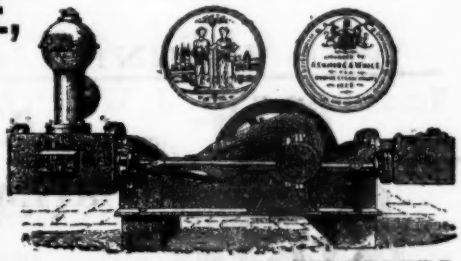
STOCKTON-ON-TEES,

ENGINEERS

AND MAKERS OF

GASHOLDERS

AND



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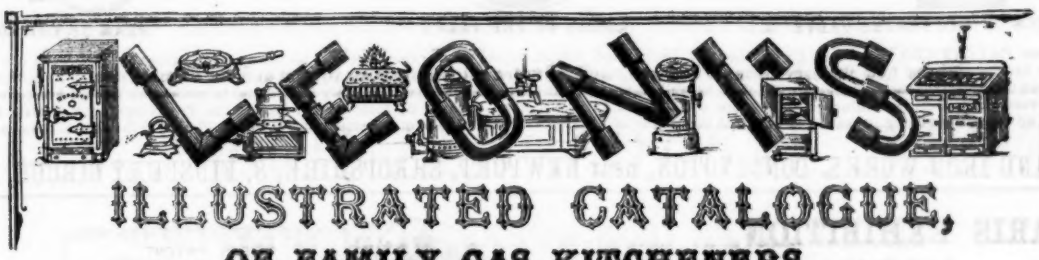
Also of the "SLIDE-VALVE" STEAM-PUMP,

For Water, Tar, Grains, Soap, Thick Fluids, Chemical, Gas, or Iron Works, Mines, Breweries, Ships, &c.

No possibility of Valves sticking, as they are actuated by positive motion from an eccentric.



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GAS ENGINEERS,

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EVERY DESCRIPTION OF GAS APPARATUS.

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NEW GAS-WORKS erected complete. Plans and Estimates furnished. MAINS, METERS, SERVICES, LAMPS, &c., adapted for Towns of any size. Gas Companies advised on Improvements, Extensions, and Alterations of Works.

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An extensive variety of Choice Designs in CHANDELIERS, PENDANTS, BRACKETS, STAR and SUN LIGHTS. MEDLÆVAL FITTINGS for CHURCHES, &c.

PATTERN-BOOKS and PRICE LISTS furnished.

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OXIDE OF IRON.
GAS PURIFICATION & CHEMICAL Co., LIMITED
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ALPHA TUBE & FITTING WORKS
Manufacturers of **W. J. WARNER'S PATENT MARKET GAS STAND-PIPE.**

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TENDERS GIVEN FOR WORK FIXED COMPLETE IN ANY PART OF THE KINGDOM.

WEST'S GAS IMPROVEMENT COMPANY.
LIMITED,

ARE NOW PREPARED TO SUPPLY AND ERECT THEIR PATENTED MACHINERY FOR

CHARGING AND DRAWING GAS-RETORTS,
And to enter into arrangements with GAS COMPANIES for its use upon moderate terms of Royalty.

The Patented Machinery has secured the approbation of all Engineers who have visited the MAIDSTONE GAS-WORKS, *where it is in full operation, and may be inspected at any time on application to the Manager.*

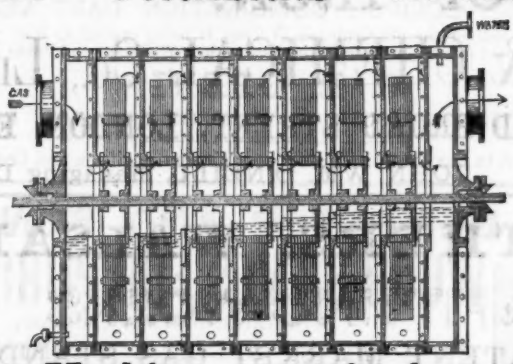
The advantages attending its use are—

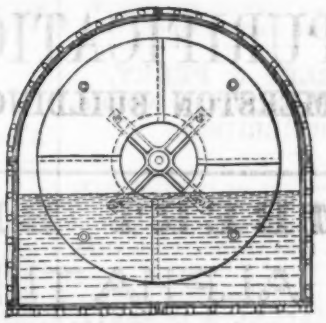
INCREASED VOLUME OF GAS PER TON.—INCREASED YIELD PER RETORT.—INCREASED BULK OF COKE FOR SALE.—REDUCTION IN LABOUR AND LESS DEPENDENCE ON SKILLED STOKERS.

A Pamphlet containing a description of the Machinery, and Copies of Reports on the working of the same, &c., will be forwarded on application to the MANAGING DIRECTOR, Maidstone. Communications may also be addressed to the Consulting Engineer, R. P. SPICE, Esq., M. Inst. C.E., 21, Parliament Street, London, S.W., or to the Engineer and Analyst, F. W. HARTLEY, Esq., A. Inst. C.E., 55, Millbank Street, London, S.W.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

PATENT "STANDARD" WASHER-SCRUBBER COMPANY.





These Machines contain from 3200 feet to 65,000 feet of Wetted Surface.

The Special Merits of this Washer are as follows:—That it is not necessary to reduce the temperature of the gas to 60°, or thereabouts, to make it effective; and that as no tar is retained in it, the illuminating power is not reduced as in Tower Scrubbers. That the distribution of the liquor is made with unerring regularity. That it occupies very small space, so that it can be, at little expense, effectually protected from extreme changes of the weather. That the considerable expense of Coke or Wood, or other Scrubbing Material, is entirely saved, and that the great nuisance and cost of from time to time replacing the Scrubbing Material is avoided. That, by the revolution of the discs, the quantity of water carried up by them, and tending continuously to fall, exposes a very large amount of fresh wetted surface to contact with the gas as it ascends. That it is particularly adapted for Gas-Works where Sulphate of Ammonia is manufactured. That it is much cheaper than any other Scrubber that will do the same amount of work effectually. That it is the only Washer suitable for purifying Gas from all its impurities by solution. That it works with a minimum of pressure. That it takes out every trace of Ammonia from the Gas in once traversing the machine, as well as a very large quantity of carbonic acid and sulphuretted hydrogen. That it requires very little outlay for foundations.

The following Testimonials show the opinion of eminent Engineers as to the capabilities of the Washer:—

Messrs. Kirkham and Hersey. *The Gaslight and Coke Company, Beckton, North Woolwich, June 8, 1880.*

Gentlemen,—I enclose you some particulars of the working of your Washers here, and I intend having some more experiments made, as just now we are working the first Washer with liquor and the second with water. Of course the fact of our having ordered two more, in addition to the four which we have in use, is a sufficient indication of my opinion of the value of the Washer.

(Signed) G. C. TREWBY.

Messrs. Kirkham, Hulett, and Chandler. *The Gaslight and Coke Company, York Road, King's Cross, Jan. 14, 1879.*

Gentlemen,—In reply to your inquiry, I am pleased to say the Washer which was put in action at this station in October last has quite fulfilled my expectations, as it confirms the experiments I made in May last with the smaller machine. Working at four revolutions per minute, it takes out every particle of Ammonia, while purifying more Gas than it was intended to do. I enclose particulars of a week's working during our heaviest make, by which you will see that it yields the full quantity and strength of liquor, and works with little pressure. I am therefore quite satisfied with the machine, and trust it may meet with the success it deserves.—I remain, &c., (Signed) JOHN CLARK, Engineer.

The following Table shows the results of the working of one of these Washers, lately erected to purify 60,000 feet of Gas per Hour, at the St. Pancras Station of The Gaslight and Coke Company:—

1879.	Nos. of the Divisions and Strength of Liquor in each.										Water used per Ton of Coals.	Gas Purified per Hour, Cubic Feet.	Ammonia on Outlet.	Temperature.			Pressures.		Revolutions per Minute.
	1	2	3	4	5	6	7	8	9	10				Inlet.	Outlet.	Atmosphere.	Inlet, Inches.	Outlet, Inches.	
	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.	oz.									
January 7	11	9	7	5½	3½	3	1½	1½	½	0	10 Gallons.	59,000	Nil.	74°	66°	31°	25	23½	5
,, 8	9½	7½	6	4½	3	2	1	½	¼	0	10 ,,	73,000	Nil.	73°	61°	31°	28	26½	4½
,, 9	11	9	7	5	3½	2½	1½	1	½	0	10 ,,	82,000	Nil.	74°	67°	33°	27½	25½	5
,, 10	10½	8½	6½	5	3½	2½	1½	1	½	0	10 ,,	66,000	Nil.	76°	64°	28°	28½	27	5
,, 11	12½	10	7½	5½	4½	3½	1½	1½	½	0	10 ,,	61,000	Nil.	73°	64°	27°	26½	25½	5
,, 12	11	8½	6½	—	—	—	1½	½	½	0	10 ,,	39,000	Nil.	74°	64°	27°	26½	25½	5
,, 13	13	10½	8½	6	4½	3½	2	1½	½	0	10 ,,	78,000	Nil.	73°	65°	42°	28	26	5

Messrs. Kirkham, Hulett, and Chandler. *Corporation of Birmingham, Gas Department, Saltley Works, May 23, 1879.*

Gentlemen,—I beg to enclose you a copy of the results of the tests which, by the kind permission of the Engineer, Mr. Clark, I made on the 6th of March last, of the working of one of your "Standard" Washers and Scrubbers at the St. Pancras Station of The Gaslight and Coke Company, and I am of opinion that, for an apparatus occupying so small a space, they are exceedingly satisfactory.—Yours truly, HENRY HACK, Engineer.

Working Results obtained from Kirkham, Hulett, *and* Chandler's *Patent "Standard" Washer and Scrubber at the St. Pancras Station of The Gaslight and Coke Company, London, March 6, 1879.*

Gas passing per Hour, Cubic Feet.	—	Impurities in Gas per 100 Cubic Feet.			Temperature.		Pressure in Inches.	Revolution of Apparatus per Minute.	—	No. of Divisions and Strength of Liquor.										Water Used during Experiment. Gallons.
		SH_2	CO_2.	Grains. NH_3.	Washer.	Air.				10	9	8	7	6	5	4	3	2	1	
64,000	Inlet	2·00	2·00	158·8	72	57	21	4½	Twaddel deg. at 60°	5·3	4·9	2·85	2·35	1·7	1·05	0·6	0·3	0·15	0·1	63
	Outlet	1·50	1·50	0·8	68	57	20		Acid, ounces.	11·0	8·4	6·3	4·5	2·7	1·7	1·3	0·7	0·3	—	

Messrs. Kirkham and Hersey. *The Leeds Corporation Gas-Works, Meadow Lane, Aug. 14, 1879.*

Gentlemen,—In reply to your inquiry of yesterday's date, I have pleasure in stating that the item appearing as income derivable from Ammonia in my estimate of revenue for current year is not an exaggeration. Our average income from Ammonia is 2s. 8d. per ton of coals carbonized, but at the works where your invention is in use we derive not less than 3s. per ton. Since the introduction of efficient Scrubbers at our works the greater yield of this product (now twice as valuable as coke to us) is such that the cost of Apparatus for its extraction can be wholly paid for out of from nine to twelve months gains. I am, Gentlemen, yours faithfully, (Signed) H. WOODALL, Engineer.

Messrs. Kirkham and Hersey. *Heywood Local Board Gas-Works, Hooley Bridge, Heywood, Dec. 1, 1879.*

Gentlemen,—In reply to your favour of the 26th ult., I beg to state that the Scrubber is at work, and doing well. I shall be glad to show it to any inquirers.—Yours truly, (Signed) EDWIN BUCKLEY, Engineer.

Messrs. Kirkham and Hersey. *Phœnix Gaslight and Coke Company, Office, Greenwich, S.E., Dec. 13, 1879.*

Gentlemen,—In accordance with my promise that I would inform you as to the working of the "Standard" Washer erected by you here in June last, I now write to say that we are passing through it 100,000 cubic feet per hour (the quantity for which it is made) direct from the Condensers, "bye-passing" the whole of our Scrubbers, which, not being needed, have been standing still since the "Standard" Washer was put in use. It seems as though the Washer more effectually removed the Ammonia when taking the full quantity of gas than less; as, at the present time, at the sixth chamber (there being eleven in all) not a trace can be discovered either by turmeric or acid litmus paper. The difference in pressure between inlet and outlet is only ten-tenths of an inch. I need scarcely say, after the above, how perfectly satisfied I am. (Signed) P. J. WATES, Engineer.

For further particulars and testimonials, address Messrs.

KIRKHAM, HULETT, & CHANDLER, Limited, { 59 & 60, Palace Chambers, Bridge St. Westminster, London, S.W.

C. & W. WALKER'S
WOOD PURIFIER SIEVES,

Which have now been used for fifteen years, and their advantages and durability fully established. They are made entirely by steam machinery in very large quantities at the most moderate cost.

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And Every Description of Best Fire-Bricks.

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Manufacturers of GAS-RETORTS, GLASS-HOUSE FURNACE & BLAST-FURNACE BRICKS LUMPS, TILES, and every description of FIRE-BRICK.
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SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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THE IMPROVED
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FOR
GAS PURIFIERS & SCRUBBERS.

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LONDON, N.

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AND
WENLOCK IRON WHARF, 21 & 22, WHARF ROAD,
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Manufacture and keep in stock at their works (also a large stock in London) PIPES and CONNECTIONS 1½ to 48 inches in diameter; and make to order Retorts, Purifiers, and Tanks, with or without planed joints, Columns, Girders, Special Castings, required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Syphons and Covers are joint-faced if required, doing away with millboard and iron boring, or Syphons made without Covers, a socket being cast on and fitted with a small plug about 6 inches in diameter with lead joint. In either way preventing leakage.

GEORGE'S
Patent Gas Calorigen,
A STOVE FOR
WARMING AND VENTILATING.
RECOMMENDED BY DR. RICHARDSON.

MANUFACTURERS:
J. F. FARWIG & CO.,
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Gold Medal Awarded, Paris Exhibition, 1878.

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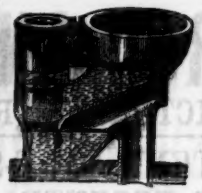

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MESSRS. W. SMEATON & SONS,
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PATENTEES AND INVENTORS OF THE
TRAPLESS, THE D TRAP, AND EDDYSTONE CLOSETS.
Also the New
ECLIPSE COMBINATION CAST LEAD TRAP.
The Price will be half of the old-fashioned D Trap, it being cast all in lead, without a Joint.
Send at once for an Illustrated Price List to their Wholesale and Retail Agent,
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SCRUBBERS FILLED WITH BOARDS,
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GLOBE METER-WORKS, OLDHAM,
MANUFACTURERS OF
WET & DRY CONSUMERS GAS-METERS,
OF THE HIGHEST EXCELLENCE ONLY;
BRADDOCK'S PATENT COMPENSATING GAS-GOVERNORS;
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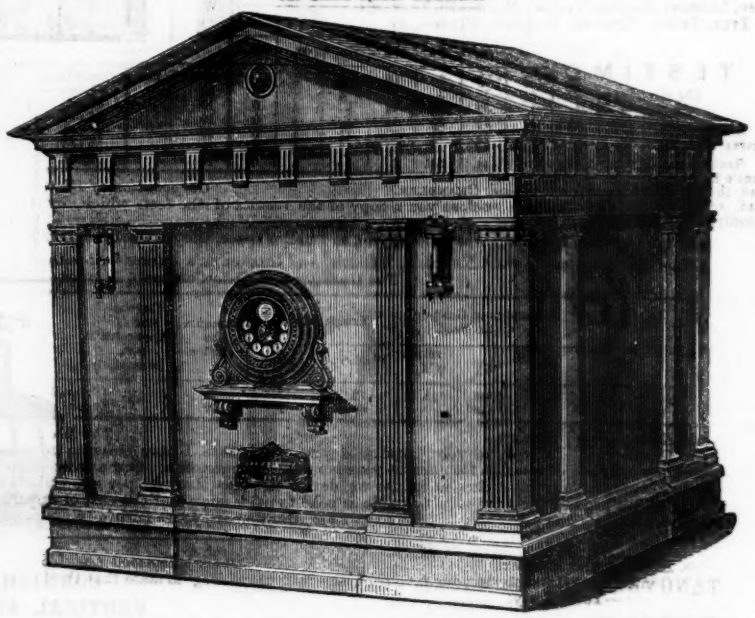

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WITH PLANED JOINTS.
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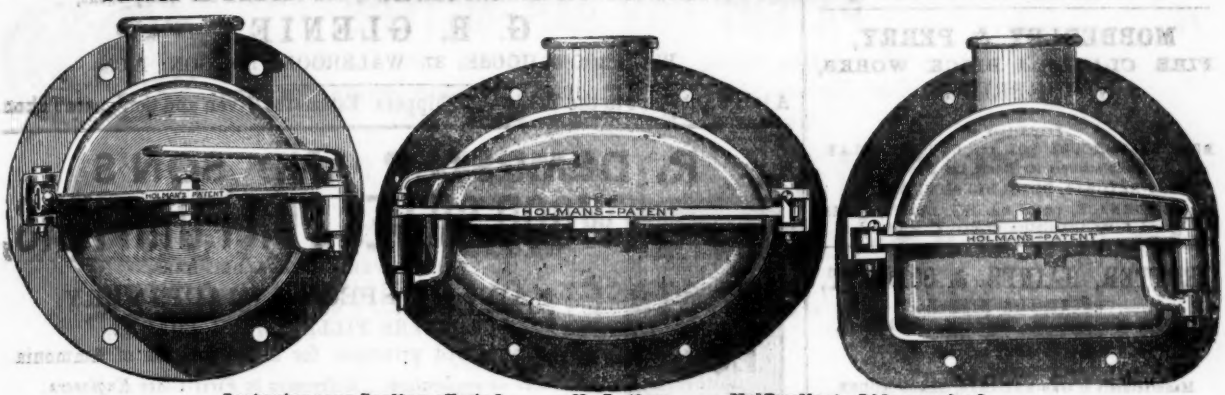
SOLE MAKERS OF MORTON'S PATENT SELF-SEALING RETORT-LIDS,

WITH HOLMAN'S PATENT ECCENTRIC FASTENINGS,

Anti-Friction Catches, and Self-Sustaining Cross-Bars.



Instantaneous Sealing effected. No Luting. No Duplicate Lids required.
Holman's New Self-Sustaining Cross-Bar ensures freedom of Joint, and maintains parallel position of the Lids.

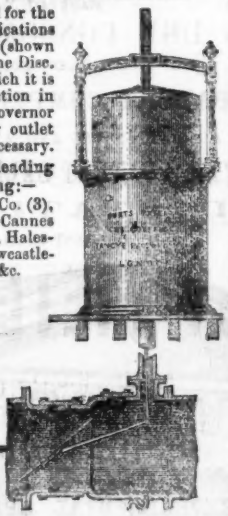
Morton's Patent Retort-Lids are in use in nearly all the Principal Gas-Works in the United Kingdom and the Colonies; also on the Continent and in the United States of America. They are now made of the

SAME FORM OR SECTION AS THE RETORT. (See Illustrations above.)

Engineers preparing Specifications of New Works will be furnished with Dimensions of Stock Patterns, together with Approximate Weight and other data on application.

HUNT'S
EQUILIBRIUM DIRECT-MAIN GAS GOVERNOR.

In this Governor a Throttle-Valve is substituted for the ordinary suspended Cone, all external communications being avoided by placing the Lever or Radius Arm (shown in the drawing) inside the Valve-Chamber upon the Disc. The Disc is carried upon steel centres, upon which it is accurately balanced and turns freely. The friction in working is thereby reduced to a minimum. This Governor is extremely sensitive to alterations of inlet or outlet pressure, and renders a large actuating holder unnecessary.



These Governors have been adopted by many leading Gas Companies, among whom are the following:—

The Gaslight & Coke Co. (19), The London Gas Co. (3), and at Abergavenny, Arundel, Birmingham, Cannes (France), Devonport, Dursley, Exeter, Guernsey, Halesowen, Leicester, Mentone (France), Monmouth, Newcastle-on-Tyne, Oxford, Plymouth, Rochdale, Windsor, &c.

TESTIMONIAL.

The Gaslight and Coke Company,
9, Water Street, New Bridge Street,
Blackfriars, E.C., Feb. 27, 1875.

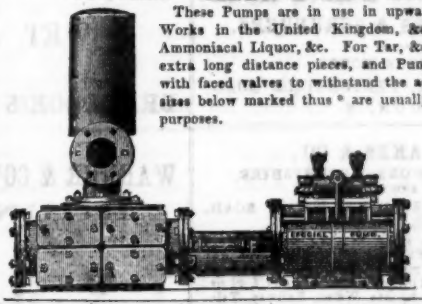
MESSRS. TANGYE BROTHERS AND HOLMAN.

Gentlemen,—The two 24-inch and three 36-inch Hunt's Equilibrium Governors supplied by you, and fixed in the valve-rooms at Whitechapel, Goswell Road, and Blackfriars, are working very satisfactorily.

Yours truly,
(Signed) JOHN JOHNSON.

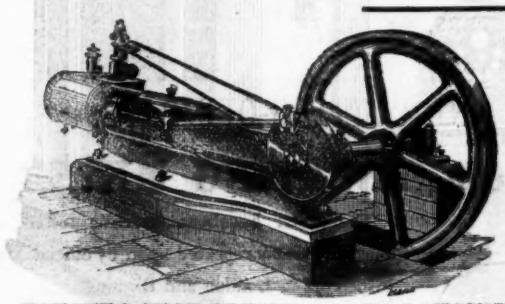
THE
"SPECIAL" DIRECT-ACTING STEAM-PUMP.

These Pumps are in use in upwards of one hundred Gas-Works in the United Kingdom, &c., pumping Water, Tar, Ammoniacal Liquor, &c. For Tar, &c., they are provided with extra long distance pieces, and Pumps are entirely of iron, with faced valves to withstand the action of the liquid. The sizes below marked thus * are usually kept in stock for these purposes.



The quantities delivered of Tar should be taken about two-thirds that of water.

Diameter of Steam Cylndr.	Diameter of Water Cylndr.	Length of Stroke.	Gals. of Water per Hour, Approx.	Prices for Water.	Prices for Tar and Ammoniacal Liqr.
*3 in.	1¼ in.	9 in.	450	£16 0 0	£17 0 0
*4 ,,	2 ,,	9 ,,	815	18 0 0	19 0 0
*5 ,,	2¾ ,,	12 ,,	1,250	21 0 0	23 10 0
*5 ,,	3 ,,	12 ,,	1,830	22 10 0	24 0 0
*6 ,,	3 ,,	12 ,,	1,830	25 0 0	26 10 0
*6 ,,	4 ,,	12 ,,	3,250	30 0 0	31 10 0
6 ,,	5 ,,	12 ,,	5,070	35 0 0	36 10 0
*7 ,,	5 ,,	12 ,,	5,070	40 0 0	41 10 0
7 ,,	6 ,,	12 ,,	7,330	45 0 0	46 10 0
*8 ,,	6 ,,	10 ,,	7,330	50 0 0	52 0 0
10 ,,	6 ,,	12 ,,	7,330	60 0 0	62 10 0
10 ,,	8 ,,	12 ,,	13,000	75 0 0	77 10 0



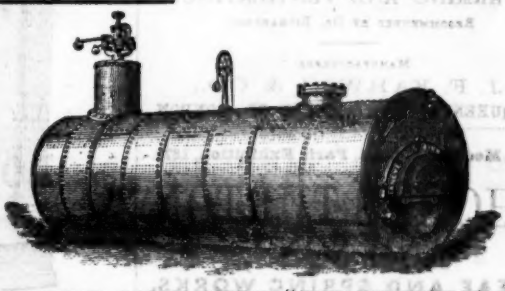
TANGYE'S HIGH-PRESSURE STEAM-ENGINE,

NEARLY 4000 IN USE.

The Design, Workmanship, and low prices of these Engines have called forth universal approval.

Nom. H.P.	2	3	4	6	8	10	12	14	20	25
	£28	£37	£44	£68	£86	£111	£122	£133	£185	£215

Including Governor and Feed Pump. Variable Expansion extra.



CORNISH, LANCASHIRE, "THE KESTERTON," VERTICAL, AND MULTITUBULAR STEAM-BOILERS OF SUPERIOR QUALITY ALWAYS IN STOCK.

This Department having been greatly extended and furnished with the most approved Boiler-making Machinery and Tools, T. B. & H. are prepared to supply all kinds of Steam-Boilers with great facility at lowest current prices.

Also Makers of IMPROVED HYDRAULIC HOISTS, TRAVELLERS, CRABS, CRANES, PULLEY BLOCKS, HYDRAULIC AND SCREW LIFTING JACKS, LATHES, PUNCHING AND SHEARING MACHINES, And all other Descriptions of Tools, &c.

FULL PARTICULARS, ESTIMATES, CATALOGUES, &c., ON APPLICATION.

London. 1851 New York. 1853. Paris, 1855. London, 1862.

Dublin, 1865.

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PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters bv the Imperial Commissioners for the Universal Exhibition, Paris, 1867.

Paris, 1867.

THOMAS GLOVER & CO.,

DRY GAS-METER MANUFACTURERS,

214 TO 222, ST. JOHN STREET, CLERKENWELL GREEN,

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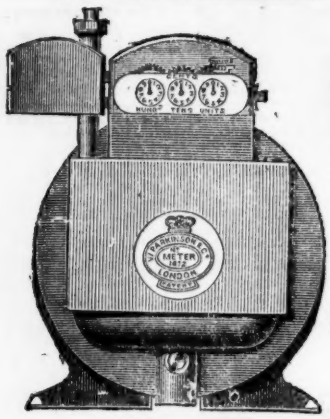
THOMAS GLOVER & CO.'S PATENT DRY GAS-METERS.

1st, Are a remedy for all the defects of Wet Meters;
2nd, Are suitable for all climates, whether hot or cold;
3rd, Incur no loss of Gas by evaporation;
4th, Cannot become fixed by frost, however severe;
5th, Are the most accurate and unvarying measurers of Gas;
6th, Prevent jumping or unexpected extinction of the Lights;
7th, May be fixed either above or below the level of the Lights;
8th, Cannot be tampered with, without visibly damaging the outer case;
9th, Will last much longer than Wet Meters;
10th, Will not cost more than one-half for repair that Wet or Water Meters do;
Are upheld for five years without charge.

WILLIAM PARKINSON AND CO.

(ESTABLISHED 1816)



WET & DRY METERS,

STATION-METERS & GOVERNORS,

EXHAUSTER REGULATORS,

PRESSURE REGISTERS, EXPERIMENTAL APPARATUS, GAUGES, WATER-METERS, &c.

SOLE AGENTS FOR

FOULGER'S PATENT SEAL UNIONS AND CUTTING-OFF CAPS.

HUNT'S PATENT IMPROVED COMPENSATING METER.

In this Meter, the action of the measuring-drum is reversed. By this arrangement an improvement is effected in the registration at high speeds, which, in many tests, has not varied from the smallest light to three times the capacity of the meter. It works equally well under all pressures. The range of error between the high and low line is much smaller than that allowed by the "Sale of Gas Act."

The Meter has been critically tested, and most favourably reported upon by official Meter Inspectors in London and Birmingham.

W. PARKINSON and CO. have made arrangements for the manufacture of these Meters, both in tin and cast-iron cases, and for the alteration of old ones to this principle, which is confidently recommended as possessing every quality that can be desired by Gas Companies, Corporations, or Private Consumers.

COTTAGE LANE, CITY ROAD, LONDON, E.C.

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TO CORRESPONDENTS.

T. W.—*Thanks for information received. Must defer notice till next week.*

H. V.—*American newspaper accounts, such as that you send, are generally so "padded" with untruths and exaggerations as to make it impossible to notice them in the* JOURNAL. *We are, however, much obliged to you for forwarding the cutting.*

SOCIÉTÉ TECHNIQUE DE L'INDUSTRIE DU GAZ EN FRANCE.—*We have received the report, just published, of the meeting of the Société, held at Lille, on the 28th of June last year. It contains much of great interest to the gas profession, and we shall take an early opportunity of referring, in detail, to many of the subjects presented to, and discussed at the meeting.*

No notice can be taken of anonymous communications. Whatever is intended for insertion, must be authenticated by the name and address of the writer; not necessarily for publication, but as a guarantee of good faith.

TO SUBSCRIBERS.

Subscribers who desire to avail themselves of the reduction in the subscription to the JOURNAL by paying in advance for the second half of the year 1880, are reminded that this can only be done during the present month.

Subscribers who have not paid their subscriptions for this, or for any previous year, are requested to remit the same forthwith to the Publisher, in order to prevent any interruption in the regular delivery of the JOURNAL.

THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, JULY 13, 1880.

Circular to Gas Companies.

THE disastrous explosion which took place in the neighbourhood of Tottenham Court Road on the evening of Monday, the 5th inst., with its sad results in the destruction of life and property, is of absorbing interest to the whole of the gas world. A full and exhaustive inquiry into the cause of the accident, and into all the circumstances attending it, will doubtless be held promptly; and we shall therefore confine ourselves this week, as far as possible, to a statement of the facts so far as they are known to us, reserving comment till we have heard the evidence which will be forthcoming.

It was a singular coincidence that at the time we were going to press with our last "Circular," containing as it did some remarks upon the liabilities of Gas Companies for damage caused by escapes of gas from street-mains, this unexampled illustration of the gravity of those responsibilities should have been just happening. Although this disaster is almost—and, in its terrible extent, quite—unexampled, yet it is of a class which is generally appreciated by gas engineers, and the avoidance of such accidents in the past is a tribute to the care with which their work has been done and its contingencies provided for. Continually, both in the streets and on the works, it is necessary to shut off lengths of working mains, and cut out portions, in order to make connections. It is impossible to completely exhaust the gas from the sections thus made dead, and a mixture with atmospheric air within the explosive limit is the result while the work is being done. In such cases not only would the application of a light to an open pipe, as in the recent accident, before valves have been opened or bags withdrawn, cause an explosion, but the same effect would be produced by the using of overheated lead in the running of a joint, inflaming the yarn used in caulking. These are dangers which have been known to exist, and we repeat that the avoidance of harm from them says much for the care and watchfulness of those engaged in such work. The accident of last week resulted not from want of knowledge as to how to deal with dangerous conditions, but from absolute ignorance of the existence and presence of such conditions at the time.

The facts are, we believe, as follows:—The Chartered Gas Company have been making preparations this spring for supplementing the supply to their western and west central districts, by a direct connection with the main from their Beckton works. This was to be effected by laying a 36-inch pipe from Goswell Road, where it would be joined to, and obtain its supply from the 48-inch (Beckton) main, through Bloomsbury to a point in Howland Street, a little westward of Tottenham Court Road. There it connected an existing 36-inch pipe, which, we presume, is at present the principal supply main to that neighbourhood from the western stations of the Company. The total length of this connecting-link main was rather over two miles. For the purpose probably of expediting the work, it was laid in two sections by separate gangs of men, but both in the employment of the same contractors. One of these sections extended from Goswell Road to the east side of Tottenham Court Road in Bayley Street; the other, that in which the explosion took place, from Howland Street, down Charlotte Street, through Percy Street, and across Tottenham Court Road, to meet the first section. Our readers unacquainted with the district will be helped in following the direction of this main by reference to the sketch which we give elsewhere; and we will, if possible, furnish a more detailed plan with our next issue. The eastern section, that from Goswell Road, is about a mile and a half long; the other rather less than half a mile. Early in March last, the working main in Howland Street was cut, and a T-branch put in, the outlet looking down Charlotte Street. On to this outlet, which was flanged for the purpose, was bolted a 36-inch valve, made by Messrs. Westwood and Wrights. A few lengths of pipe were then laid from the valve, so as to carry the excavation clear of Howland Street, and avoid again interfering with its traffic, and the short length so laid was capped up and left. The laying of the main itself was then commenced from the Tottenham Court Road, under which thoroughfare it was carried at a depth, we believe, of about nine feet, so as to clear the pipes already in position, and also a pneumatic tube used by the Post Office authorities. By about the middle of May the laying of this section was completed, and a connection was then made on to the short length already referred to, so opening up the whole main to the valve which severed it from that which was charged with gas. When this connection was made it is said that the air in the short length was pure, showing no sign of the presence of gas, thus confirming the Company's Chief Inspector in his confidence in the soundness of the valve. It will thus be seen that for nearly two months this section had been finished; it was capped up at its eastern end, the paving of the streets was made good, and no doubt was entertained that the valve which had shut out the gas from the short length would do so equally securely from the longer one. Meantime the section from Goswell Road was being laid, and a few days before the accident it was completed ready for connecting. No junction had been made with a live main in this case, and when the work was tested the length was closed at each end by a cap. If we are rightly informed that a pressure of over twenty inches was put within this main, and that it was maintained for twenty-four hours with no appreciable loss, there could be no better testimony to the care and accuracy with which the work had been carried out. The western section was tested on the day of the accident by pumping air into it through a two-inch pipe at the Bayley Street end. We have not heard what the result was, but we assume that it was satisfactory, because the two lengths were to be joined on the following day. This is a question of much importance, as we shall point out farther on.

We have thus stated the history of this unfortunate main so far as we are acquainted with it down to the evening of the 5th inst., when preparations were being made to connect its two sections together. On that evening a foreman and two or three men remained on the work to cut out the joint round the cap, and remove it to make room for the short piece of 36-inch pipe which, with a collar, was to make the connection.

We now come to a portion of the story which reads just as though some adverse Fate had meddled in the matter. It will be borne in mind that all those who were engaged in the work were under the impression that both sections were equally *dead*. The foreman knew all about the valve, and that it had never been opened; he knew also that air had been blown into the pipe that day, which would remind him, if it were needed, that gas had not yet been turned on. Nevertheless, while two of the men were engaged in cutting out the cap, the foreman removed the gauge which had been used for testing, and which showed that there was no pressure in the main; then having detected no smell of gas, he struck a match, and applied it to the open half-inch pipe, with the terrible results which are detailed elsewhere. We do not say that the effects might not have been equally serious had the cap been removed and a light accidentally applied to the open main; but this does not diminish our difficulty in comprehending the action of the foreman. He is a man of much experience, and has a reputation for special intelligence. He knew that the main had not been charged, that there was no pressure in it, and that if there *was* any gas present it must necessarily be a cause of great danger; still, although smoking was prohibited as dangerous, he applied the light *as a precaution*. If the same man was employed in the eastern section, it will be interesting to know whether, before removing the cap from the end of that main, he acted in the same way, and if not, what suggested the unusual course which he unfortunately adopted.

The Company, through their Chief Inspector, Mr. Hersey, have suggested an explanation of the presence of gas in the main. Satisfied apparently that the valve was sound, they assumed that there was a fracture in one of the lengths of pipe, and that by way of this fracture gas had found entrance through the soil about it from one of the service-mains in the street, which must also have been broken. This theory would not, we are sure, have been started unless there was some good foundation for it, as the probabilities are hardly in its favour; but it is in relation to this theory that the proving of the main becomes of importance. If, when pressure was applied in the early portion of the day, no leakage was apparent, no air escaping, the difficulty will be great in understanding how gas could have found its way into it as suggested. On the other hand, if the result of the testing was to show that the main was not sound, a slight leak in the valve would explain it as readily as a fractured pipe, and we are thus driven back upon further evidence and upon probabilities, in judging between the two theories. Every effort will be used, we do not doubt, by all the parties concerned to find out the exact truth and all the truth in regard to this most sad occurrence; and that the truth will be made apparent is the more likely because—or so it seems to us—no party or person is interested in repressing it. How slight may have been the cause of this disaster will be realized by our readers when we mention that an escape into the main of less than one foot of gas per hour from the time when it was closed in the month of May, would be sufficient to charge it with the terribly explosive mixture which was present in it on the 5th of July.

Upon visiting the scene none can help being impressed not only with the terrible force of the explosion, but also with the comparatively small amount of personal injury caused by it. Deeply deploring the death of the two workmen, and the suffering of the others who were hurt, our wonder is that their number was not many times greater. The explosion found vent in seven different places, throwing up in all probably a hundred yards length of paving, in some cases hurling the great stones higher than the tops of the houses, from whence they rained down again into the street. Yet, so far as we are aware, not one passer-by was seriously injured. The houses which have suffered are damaged, we believe, less than their appearance would indicate. All had areas in front of the basement windows, and the force of the explosion was largely spent in throwing in these area walls. No settlement appears to have taken place with any of the walls of the houses proper, and we saw no cracks in them. The carrying of the main under the crowded thoroughfare of the Tottenham Court Road at an unusual depth probably avoided a far more terrible scene than any of those which did occur. Even this, however, strikes us less forcibly than the escape from fire. When the valve in Howland Street was wrecked, the gas from the 36-inch main in that street had free way to escape unchecked. Even at this, the farthest extremity of the main, after vent had been found in six different places, the force was still great enough to drive portions of the valve through the back of the branch to which it was attached, almost severing the working main in halves. That there should not have been flame remaining of that which accompanied the explosion is in itself remarkable. Had there been, this great volume of escaping gas would have been converted into a vast column of fire, which would have endangered the safety of the whole neighbourhood. Willing hands, under the personal direction of Mr. John Aird, filled in the ruined pipe with clay, and so checked the flow of gas; but it was not till some seven hours after the accident that the main was safely cut off and the terrible danger removed.

One, and that not the least, of the evils resulting from this explosion is the vague alarm which it has created in the minds of a large number of people, and which the grossly ignorant and injurious comments of a "largely circulated" section of the daily press has done much to foster. The public has a right to expect that this sensational but alarming nonsense will be met, if possible, by a plain unvarnished tale of the occurrence and its causes, and in this we believe they will not be disappointed. Such a story will, we also believe, make it clear that some special circumstance in this case has caused the disaster—a circumstance which, in the experience of half a century, has not been encountered before, and which, having now been clearly apprehended, will be safely provided against in the years to come.

[Since the above was in type, we learn that last evening, in the House of Commons, the President of the Board of Trade, in reply to a question by Mr. Firth, stated that he had no authority to institute an independent inquiry into the circumstances attending the explosion; but that he had communicated with Dr. Hardwicke, the Coroner, and, with his approval, had appointed Mr. Vernon Harcourt, one of the Metropolitan Gas Referees, to act as his assessor at the inquest.]

What may be regarded as a most satisfactory meeting of the North British Association of Gas Managers was held at Perth last week—Mr. J. Robb, of Haddington, presiding. There was a large attendance of members, and the programme for the meeting was of so varied a character that the interest in the proceedings was thoroughly well sustained to the very end. In this place it is right to say a word in praise of the arrangements made by the new Secretary (Mr. David Terrace), a worthy successor—which is really saying a great deal—of Mr. Mackenzie, who, it may be remembered, after long service, retired last year from that office. A preliminary notice of the meeting will be found in another column, and our usual full report will appear in due course, when we may take an opportunity of calling attention to some of the salient features of the communications made to the Association. The only regrettable incident of the meeting was a digression from the programme so as to allow of a disquisition by Dr. Miller, of the Perth Academy, on "Heat: Its Mechanical Energy." The matter discoursed upon by the learned Doctor was such as could be obtained from any elementary book on physics, and it seemed a great pity—and in this we feel sure we shall be supported by the vast majority of those present—that the time of the meeting for close upon an hour should have been taken up by what, interesting as it was in its way, was not specially adapted to a gathering of gas managers, called to listen to the reading of a set of papers, any one of which would, with advantage, have borne fuller discussion than was accorded to it. This, however, by the way. We trust, as we expect, that next year's meeting in Glasgow, under the presidency of Mr. J. M'Gilchrist, will be as satisfactory as last week's was, with the sole exception noted above.

We are unable to see what good purpose can be served by the intended action of the Commissioners of Sewers of the City of London in lighting the main thoroughfares from Blackfriars to London Bridge by the electric light. The idea of this important "experiment" seems to have arisen with the Bridge House Committee, who proposed at first to adopt electric lighting for their three bridges—Blackfriars, Southwark, and London—and this project spurred on the Commissioners of Sewers to take the extended action above indicated. New Bridge Street, Queen Victoria Street—lately so magnificently lighted by The Gaslight and Coke Company with Sugg's burners—Queen Street, Cheapside, King William Street, St. Paul's Churchyard, and Ludgate Hill, together with the City bridges before mentioned, will

soon, if the Commissioners have their way, be handed over to the sputtering carbons, *vice* gas relieved—to be called in when wanted. Taking this length of roadway in conjunction with the Victoria Embarkment, where the Metropolitan Board of Works have been carrying on their "experiment" for some time past, the night wanderer in London will be enabled to walk or drive from Westminster to London Bridge by the magneto-electric light. Truly an imposing "experiment" this will be. But how much longer will these exhibitions of electric lighting be put before the public as "experiments"? An experiment is a proceeding taken with the object of obtaining information. But the electric light has been already tried within the precincts of the City, to say nothing of the proceedings on the part of the Metropolitan Board of Works, about which, of course, the City "Fathers" could not be expected to know anything. Whence, then, this need of further trial, or why call it a trial, more than in the limited sense in which all mundane things are undergoing probation? Perchance the Commissioners of Sewers have special and private means of acquiring information as to the wishes and desires of the population whose ways they keep, and have come to the conclusion that the Holborn Viaduct exhibition was so generally admired that the public want another like it. The public taste in matters of this kind is difficult to determine with exactitude, but it certainly appeared to us as though the aspect of Queen Victoria Street, under The Gaslight and Coke Company's government, was far more brilliant than the Viaduct under the conditions mentioned. Perhaps the City authorities are in doubt on this point, in which case, having, we presume, settled, as a necessary preliminary proposition, that the leading thoroughfares under their control require to be better lighted than at present, let them call upon The Gaslight and Coke Company to illuminate the main streets in continuation of the lines above mentioned, such as Gracechurch Street and Bishopsgate Street, Moorgate Street, and Fleet Street with the most improved form of gas-lamps. Then, after a year's experience of both systems, they will be in a better position to form a judgment on the whole question, and will, moreover, have had enough of "experi-"ments" in street lighting, until some future advance in science shall have given fresh grounds to work upon. But, in respect of the present proposal, it is to be hoped that some attempt will be made to gauge the feeling of the public, who will eventually have to find the money, before a binding contract to light with electricity, or by other means, such a vast length of thoroughfare, at a cost equal to six or seven times that of gas, is entered into by the Commission. What we should like to know is whether the public really demand that the City streets should be lighted throughout the night six or seven times more brilliantly than at present; and, if so, whether they are willing to bear the consequent expense. Judging from our experience of some of the thoroughfares named, where during the greater portion of the night the solitary policeman may be seen in undisturbed possession of streets that in daylight teem with business life, the present street-lamps are quite sufficient, except, it may be, during a few hours in winter evenings. But if more light is really required, why confine the opportunity of supplying it to one system of lighting, and that not by any means universally favoured? The whole action of the Commissioners of Sewers in this matter is ill-considered and unnecessary, and if they are not appalled by the estimate of the cost of carrying out their proposal, it is to be hoped that, for once, sufficient public interest will be aroused as to their proceedings, to prevent the City being heavily taxed to gratify the experimental ardour of a few amateurs in street lighting.

The gas undertaking of the Ramsgate Local Board has had a very successful year's working. The price of gas in Ramsgate is determined, in accordance with a special clause in the Local Board Act, 1877, with reference to the disposable annual profits, which are divisible in equal moieties, one going to the district fund, and the other being returned to the consumers by way of rebate in the gas accounts due at the time when the annual statement of accounts is presented. In this way the selling price of gas, which stood at 4s. in 1879, is now 3s. 2d. per thousand feet. The public lamps are charged as nearly as possible at prime cost. The works are in first-rate order, and fully equal to the probable increased production for some years. The undertaking, it will be recollected, came into the possession of the Local Board in 1877, and according to the Chairman's statement at the recent meeting of the Board, there has been an increase of 41·5 per cent. in the quantity of gas sold since that time. Mr. W. A. Valon, the Engineer, is to be congratulated on his working results, which show a sale of 9563 cubic feet of gas per ton of coal carbonized, with a percentage of only 4·71 unaccounted for, and a fuel consumption of 20·28 per cent. of the coke produced, while the residuals returned 50·63 per cent. on the cost of the coal. Thus it will be generally acknowledged that the Local Board and the gas consumers of Ramsgate have every reason to be satisfied with the manner in which their gas affairs are conducted.

The gas question in one of its many phases has asserted itself again in the Manchester City Council, where a desultory discussion arose last Wednesday respecting the manner in which the cost of street lighting is to appear in the accounts of the Gas Committee. The Committee intend that this item shall be made a direct charge in their own revenue account, instead of being charged to the city fund; but this proposal is opposed by many persons both within and without the Council. The Committee held their own, by a substantial majority, on this particular occasion; but, as we have repeatedly remarked, the administration of the Manchester gas undertaking is conducted altogether in accordance with peculiar principles, protected in a great measure by legislation belonging to the dark ages of local self-government, and such as is not likely to be repeated in modern times. Neither the Gas Committee nor their opponents are wholly to blame for the continual snarling which goes on in respect of this unsatisfactory system of management. The system itself is a growth of years, and will not be altered, much more uprooted, without much local disturbance. We do not, however, so much dishonour the spirit of true finance as to despair of seeing at some future time indirect municipal taxation eventually given up even in Manchester. Do we not remember with what zeal the reformers of the Manchester school of Free Trade have always attacked the unrighteous adherence to indirect taxation, of all benighted nations who have endeavoured to raise revenue by taxing imported cotton goods?—of course, in the interests of political economy only. Now, if there be any such ardent spirits in the body which confines itself to controlling local affairs, we would commend to their consideration the truth contained in the proverb which may be made to read, "Political economy—like charity—"begins at home."

A truce has been arranged between the Corporation of Dublin and the Alliance Gas Company, who have so lately been at cross-purposes in the matter of street-paving and main-laying, the Corporation having accepted the Company's terms, which they had previously rejected. There should never have been any dispute, as the Company were clearly in the right from the first, and if this had been seen by the Paving Committee, much annoyance to the citizens would have been avoided.

From a bulky volume of statistical information concerning Glasgow, emanating from Mr. W. West Watson's (the City Chamberlain's) office, we gather that the Corporation gas undertaking is in a very satisfactory state. Glasgow gas is always maintained at from twenty-five to thirty candles illuminating power, and during the whole of the past year it was never observed to fall below the former figure; while the selling price is 3s. 10d. per thousand feet—an average of only 1·67d. per candle. Progress has not, however, always characterized the yearly statements of the Gas Committee. Thus, the production of gas for 1878 was less than that of the preceding year, but the past year shows a healthy recovery, the production having advanced sufficiently to make up in some measure for the previous falling off. Now the corner has been fairly turned, we may hope that a long time will elapse before the Gas Committee again have to chronicle a positive decrease in their business.

Death of Mr. F. J. Evans.—After the announcement, in last Journal, of the very serious illness of Mr. Evans, our readers will not be unprepared for the news of his death, which occurred last Thursday at his residence, "Clayponds," Brentford, W. A biographical notice of the deceased gentleman is in course of preparation, and next week we hope to lay before our readers an account of his life and labours in the gas profession.

A Gas Apparatus Exhibition for Belfast.—From an announcement in our advertising columns to-day, it will be seen that the Gas Committee of the Belfast Corporation are arranging for an exhibition of gas-engines, stoves, ovens, burners, and other appliances for the economical use of gas. This will be held in the Grain Market, during the fortnight from the 16th to the 28th of next month; and, under the energetic superintendence of Mr. James Stelfox, the Gas Engineer to the Corporation, the exhibition will doubtless prove an unqualified success.

In the Edinburgh *Journal of Artificial Light and Sanitary Gazette* for Saturday last appeared the announcement "that from this date its issue will be suspended." Rumours have been in circulation for some time past that such an occurrence was imminent; and we take this opportunity to informing our readers north of the Border that we shall now endeavour of devote more of our space to Scottish Gas Affairs, and ask their co-operation in sending us items of news that they consider will interest the gas profession generally.

Water and Sanitary Notes.

THE Select Committee on the Water Supply of London finished their examination of Mr. E. J. Smith on Tuesday last. On Friday, Mr. Allen Stoneham, the Auditor appointed under the Metropolis Water Act of 1871, gave evidence, followed by Lieut.-Col. Bolton, the Water Examiner appointed under the same Act. Thus, in the course of four weeks, the Committee are as far as the third witness. Down to the present time the inquiry has been chiefly directed to the financial aspect of the scheme of purchase. The quality of the article to be bought has still to be considered. Lieut.-Col. Bolton has been questioned as to the state of the works, and although this witness is officially cognizant of the quality of the water, it is not unlikely that evidence at some length will be sought elsewhere on that point. The practicability of obtaining a supply from some new source has also been proposed for consideration. Possibly, seeing that the session is rapidly passing away, the Committee will adopt some expedient by which they will be enabled to present a report at an earlier date than can now be reckoned upon. Thus far, a more tedious inquiry than that which Sir W. Harcourt has initiated has seldom fallen to the lot of a Parliamentary Committee. The evidence given doubtless contains much that is valuable, but one honourable member complained that having perused the replies given by Mr. Smith to Mr. Philbrick, in reference to the back dividends, he "could not understand them." It will be the duty of the Committee to study and understand all the evidence; but it is to be regretted that the important subject to which it relates should come before Parliament in such a cumbrous shape. The Home Secretary has laid the basis of the inquiry on such a scale that great delay must arise in approaching the final issue, unless a short cut be made so as to get out of the difficulty. It would be a merciful act on the part of the Companies if they would offer some reduction in their terms, so as to make a golden bridge whereby Sir W. Harcourt might retreat.

It is a question for the Water Companies to consider whether it is of any use for the existing terms of purchase to remain under consideration, when it is so thoroughly apparent that in the opinion of the Committee these terms are extravagantly high. If there is no prospect of the terms being accepted, it might be better to withdraw them at once. Policy may perhaps dictate, on the other hand, the advantage of playing a waiting game. If Sir W. Harcourt chooses to amuse himself and wear out his Committee by fighting the terms of purchase, the Companies will have another year of life, and there is no saying what may transpire to benefit them. But if the Companies are themselves tired of the uncertainty which besets their undertakings, they had better seek to put the matter on a fresh footing, for, unless something of the kind is accomplished, the period of uncertainty threatens to be indefinitely prolonged. If any man is sick of this Committee, it must be Sir Richard Cross. Twice a week the terms of purchase negotiated under his auspices are stuck up to be shot at, and we should suppose that by this time nobody expects to see such terms finally adopted. The Committee may possibly be disposed to approve of the price in regard to one or two of the Companies, and would not be unwilling to recommend that a purchase be effected to that extent. But if the Committee did this in any other case than that of the Kent Company, they would be virtually approving of the present supply, which is hardly consonant with the notions of the Home Secretary. Altogether the inquiry is in a very unsatisfactory state. Its only practical issue appears to be that of showing that the terms of purchase negotiated by Mr. Smith are not sufficiently favourable to the public, and are not therefore to be recommended to Parliament.

There was something remarkable in the evidence of Lieut.-Col. Bolton. This gentleman stated that his first interview with Mr. Smith in reference to the purchase of the Water Companies undertakings was on Dec. 1, 1879, and that he did not present any report to Mr. Smith on the state of the works until January 20, and then only in reference to the Chelsea Company. According to the evidence of Mr. Smith, the pecuniary terms of purchase were practically settled by that date. Conversationally some information had been given to Mr. Smith before that period, but not in the form of a report. Such conversational information was not considered by Lieut.-Col. Bolton to be at all of a definite character, neither value nor terms being mentioned by him to Mr. Smith. In preparing his subsequent reports, Lieut.-Col. Bolton found that he was expected to go into an amount of detail which time would not permit, and altogether that he was to undertake a responsibility which it was out of his power to accept. So strongly did Lieut.-Col. Bolton feel this, that on Feb. 4 he drew up a memorandum in the nature of a protest, and took it to the Home Office. Two days afterwards, Lieut.-Col. Bolton attended at the office of the Local Government Board, and was taken by Sir John Lambert to the Home Office, where he met Mr. Smith, Sir Theodore Martin, and the President of the Local Government Board. Mr. Smith then asked Lieut.-Col. Bolton to sign the following certificate, which he had prepared for his signature:—"I "hereby certify that the plant and works of the eight London "Water Companies are, to the best of my judgment and my "opinion, in a fit and proper working condition." In reply to this request, Lieut.-Col Bolton stated that he could not give such a certificate, for the reasons stated in his memorandum of Feb. 4. Thereupon Mr. Smith asked him to give a certificate in his own words, which Lieut.-Col. Bolton did. This certificate stated that an expenditure within £100,000 was necessary to rectify existing deficiencies. In evidence before the Committee Lieut.-Col. Bolton estimated roughly that the requisite outlay would be £60,000.

It is sufficiently clear that in a comparatively short space of time, though not until after the period when Mr. Smith had concluded his negotiations, Lieut.-Col. Bolton had succeeded in putting on paper a vast amount of information relative to the state of the Companies works. Still it was his opinion throughout that much more was wanted, and he advised Mr. Smith at the outset that a special report should be made upon the works of each Company by an independent professional engineer. To that opinion Lieut.-Col. Bolton still adheres, saying to the Committee: "Although "this information is useful and general, still it is not the "information which, in my opinion, would enable any one to "arrive even at the approximate value of the works." We may suppose that Sir W. Harcourt will lay great stress on the circumstance that Mr. Smith made his bargain with the Companies without possessing precise knowledge as to the state of the works. It seems strange that nothing is said as to any arrangement being made by which this element of value should be properly considered when the time came for carrying out the purchase. The bargain might have been struck subject to any deduction afterwards shown to be necessary on account of defects in the works. If no such proviso existed, it is difficult to see what was the good of inspecting the works after the bargain was struck, as the examination in that case would only serve to show how much money the public authority would have to expend to make good the existing defects. The whole business was hurried, and was necessarily done somewhat "in the rough." It is easy now to be critical, and on some points the transaction will not bear very rigorous criticism. Mr. Smith believes he did well, but he fails to satisfy Sir W. Harcourt on that point, and the general current of public opinion is unfavourable to the contemplated bargain.

The evidence of Mr. Allen Stoneham, showing how many years purchase of the income are represented by Mr. Smith's terms, will not improve the prospect. The years were calculated by Mr. Stoneham to be as follows for the respective Companies:—Chelsea, 43; East London, 45; Grand Junction, 43; Kent, 42; Lambeth, 41; New River, 40; Southwark and Vauxhall, 43; West Middlesex, 31. We give the figures for what they are worth, but they must be used with caution, as they include the prospective increase, which varies greatly in the case of different Companies, and there are other complications. In the aggregate the immediate stock required to carry out the scheme would be £22,098,700, and the deferred stock £9,300,000, making a total of £31,398,700. Taking the present value of the deferred stock, the total becomes £29,734,281. A paper handed in by Mr. Stoneham shows that the income of the eight Metropolitan Water Companies, during the past year, in the shape of water-rates, was £1,427,818. Rents and extra receipts added £12,454, and interest £5255. On the other side, interest payable on loan capital amounted to £101,637, the dividends paid on preference capital were £42,677, and the dividends on share capital £676,062, while the losses on collection of water-rates were written off as £61,081. The expenditure for maintenence of works and for pumping was £254,671. Rates and taxes took £87,504, and commission to collectors £37,672. The total expenditure for works by the close of the year was £12,317,304, of which one-fourth appertained to the New River Company, and very nearly one-sixth to the East London. The total of ordinary share capital is £8,887,466. The preference capital is £875,050, the loan capital £255,365, and the debentures £2,238,550.

The special report of the Select Committee of the House of Commons on the Liverpool Corporation Water Bill states

that there seems to be sufficient reason why the Corporation should have preferred the Vyrnwy scheme to any project for taking water from the Cumberland Lakes, whether in connection with the Manchester aqueduct from Thirlmere, or from some other of those lakes. The Committee are also satisfied that the various interests affected by the scheme in the Severn Valley have been sufficiently guarded by the modifications made in the Bill, and that the effect on those interests will be salutary rather than otherwise, as regards the fishing, the navigation, and the effect of floods. The report goes on to state that the quantity of water to be abstracted from the Severn Valley by this scheme will not be sufficient to "interfere seriously with any plan which may "hereafter be found expedient for the water supply of the "town population in the Severn Valley, or even of the "Metropolis." The Committee have so far followed the precedent furnished in the case of the Manchester Water Act as to secure that facilities for future water supply should be afforded to the districts of Warrington, Widnes, and St. Helen's by the Corporation of Liverpool, under agreements. In the deliberations of the Committee, Sir John Lubbock brought forward a draft report differing from the foregoing, but it was only supported by himself and Mr. Blennerhassett. In the opinion of those two gentlemen, Parliament should have further evidence on certain points "before permitting Liverpool to take a supply of water "so far out of her own natural area." Sir John Lubbock's proposals have reference to an arrangement such as that recommended by the Duke of Richmond's Commission, which reported that the northern lakes were "the best source of "supply for the large and growing masses of population in "the north and centre of England," and laid it down as being wrong in principle that any one town or district should take possession of the gathering-ground geographically belonging to another. Despite such considerations, the Worcester Town Council have expressed their satisfaction with the terms which they have obtained under the Bill, though a few members of that body consider that something more ought to have been gained. The Town Clerk, in acknowledging a vote of thanks on the subject, stated that Worcester would have a flow from the works of the Liverpool Corporation to the extent of ten million gallons a day, with a supply given monthly, which would make the actual daily supply 13,500,000 gallons.

At the annual meeting of the Sanitary Institute of Great Britain, held under the presidency of the Earl of Shaftesbury a few days ago, an interesting paper was read by Captain Douglas Galton, on "Some Preventible Causes of Impurity in London "Air." It was remarked that very slight efforts had been made in the direction of purifying the air of towns from smoke. Lord Shaftesbury observed that while it was necessary for the mass of the people to be instructed in the principles of sanitary science, it was also necessary for engineers and architects to understand such matters more than they did at present. Concerning the latter, his lordship remarked that they seemed to know as little about sanitary arrangements, ventilation, and drainage as they did about the moon. Mr. Chadwick is reported to have said that all the doctrines propounded and elaborated by the Board of Health, upon which he worked with Lord Shaftesbury, had been carried out "somewhere." Was the reporter malicious or mistaken? At the anniversary dinner which followed the meeting, Commander Cheyne expressed the pleasure he felt in announcing that Dr. Richardson had undertaken to superintend the provisioning and equipment of the next expedition in search of the North Pole.

A deputation of millowners, woollen manufacturers, paper makers, and others from across the Tweed, recently waited on the President of the Local Government Board, representing that if the Rivers Pollution Act were carried out with increased severity during the next three years, it would almost have the effect of stopping certain manufactures in Scotland. In the course of his reply, Mr. Dodson said it was not improbable that before long the whole question of the pollution of rivers, as well as other sanitary matters, would have to come under consideration; but nothing could be done during the present session. Respecting the action of the manufacturers on this point, it may be observed that most of them require tolerably clean water to begin with, and if the pollution of rivers be not checked, they will be put to considerable trouble to fit the water for their own use. In other words, it may become a question whether it would not better answer their purpose to purify the water after using it, instead of having to purify it beforehand. It has also been understood that many manufacturers were willing to purify the water as it left their premises, providing the rule were made general. Obviously it is a very discouraging task for a manufacturer to receive dirty water, and to be at the expense of sending it away clean. It is possible that some modification of the existing law may hasten the desired consummation. It seems only fair that a manufacturer, having used the river water, should be compelled to restore it to the river in the same state in which he received it. But it is unreasonable to demand that the water which leaves his premises should be purer than that which enters it. If he were required to send the water on to his next neighbour in identically the same state in which it came to him, there can be no doubt at all that the purity of the river would continually increase, while the burden of the expense would either remain the same or even become less. These remarks, however, have their limitation. They apply readily enough to manufacturers who make use of the river water for their several processes, and, having polluted it, discharge it into the stream. There are others who pollute the stream in a more highly artificial manner. Concerning these it may be contended that they are going beyond their rights in so carrying on their business as to render the stream unfit for use by their neighbours. Certainly, if there are means available by which such annoyance and damage can be avoided, those means ought to be employed, and in case of neglect there is good ground for a penalty. At all events, there must be some medium between the ruin of a river on the one hand, and the ruin of the manufacturers on the other.

Correspondence.

[We do not hold ourselves responsible for the opinions expressed by Correspondents.]

MR. NIVEN'S PAPER ON CORRECTIONS FOR TEMPERATURE AND PRESSURE.

SIR,—I must admit "a hit, a palpable hit," from Mr. Niven, who in his letter, in your last number, says: "The 'Manual' I have was published under the editorship of Mr. Hartley himself, in 1862; that is, five years after the publication of 'Bunsen's Gasometry,' in English, by Roscoe, which had the correct coefficient [for the expansion of gases] as finally fixed by Regnault." Mr. Niven then justly says that the duty of an editor is to indicate the most recently-established facts and principles. I plead guilty to the indictment, submit myself to the mercy of the court, and only say, "Please, your Honour, it is a long time ago, and a lot of people were just as wicked as I." Why, the Metropolitan Gas Referees, appointed in 1868, adopted Mr. Wright's table, and published it in their Instructions, continuing to do so until about two years since, when Mr. Vernon Harcourt calculated the new table, in accordance with Regnault's coefficient, and took aqueous tension also into account. It certainly did not occur to me that the differences between the old formula and the new were very important from a practical point of view; but the propriety of the Referees action in issuing the new table is beyond question, and the old table must now be regarded as obsolete.

I have pleaded guilty without hesitation, as the "prosecutor" shows such a kindly spirit, and evidently only desires, in the cause of truth, to compel a culprit to a confession.

Mr. Niven, commenting on the formula $\frac{17{\cdot}64\ (h - a)}{460 \times t}$, says: "I take it for granted that no printer's 'devil' has been poking fun at the formula." That he is wrong in his conclusion will be shown presently; but I must remark that a devil of some kind has played a sad trick with Mr. Niven's formula, for, as given, I find—

$$\frac{460 + t^{60}}{492 + 28} = \frac{460 + 60}{520} = 1;$$

which means $460 + t$ raised to its 60th power, divided by $492 + 28$, equals $460 + 60$ divided by 520. The product of t, even if this be taken as 2 only, raised to its 60th power would come to more figures, I fancy, than the printer of the JOURNAL would care to find; while its publication would scarcely be of interest. Of course Mr. Niven means

$$\frac{460 + (t = 60)}{492 + 28}$$

Well, compositors, as well as "devils," play strange tricks, for the formula is given, unhappily, in most copies of my book as $\frac{17{\cdot}64\ (h - a)}{460 \times t}$, instead of $\frac{17{\cdot}64\ (h - a)}{460 + t}$; although my *proof sheets* were correct. Mr. Niven justly objects to the compositor's blunder, for I am sure he is satisfied that the absurdity is not due to me any more than t^{60} can be due to him. The × in my book is so small that it was only very recently that I observed it—small type being scarcely so clear to me now as it was 20 years since.

Mr. Niven has analyzed the contracted formula—which in its correct form is due to Mr. Harcourt and not to me—so that I need make no further remark on this head than that although the formula as given is incorrect, the table is correct with, I think, one exception, where the compositor ingeniously contrived, *after revision*, to insert a 2 instead of a 9—to break the monotony, I suppose (29·8 inches and 72°). This is an error which can deceive no one.

It is a great pity that, in all such calculations as are now in question, the Centigrade scale is not universally employed, and the differences in gaseous volumes due to temperature calculated from the absolute zero. We should then get rid of the abominable 32° which have now to be taken into account on the Fahrenheit scale.

The appendix to my book is, I may state, issued with the book, as a pamphlet.

I cannot close this letter without expressing my deep sense of the

generous spirit which marks Mr. Niven's letter. Such letters lift controversy from the low level of mere bickering into that of intellectual enjoyment. Mr. Niven has set an example which is worthy of imitation. It is quite certain that he has been trained in a school where personal irritations are completely subordinated to the noble desire to give and to obtain knowledge. I thank him sincerely for the expression of his respect towards myself, and can assure him that I entertain as warm a regard towards him.

F. W. HARTLEY.

55, *Millbank Street, June* 30, 1880.

[We may state that Mr. Niven, and not the "poor compositor" this time, is responsible for the correctness of the letter published in last week's issue; a proof of it having been sent to our correspondent, and returned by him previous to its appearance.—ED. J. G. L.]

SIR,—As a son of the late Alexander Wright (who some 30 years ago constructed a table of specific gravities of gases at different temperatures and under different barometric pressures), I beg to be allowed permission to make a few remarks upon Mr. Niven's criticisms, in his paper recently read before the West of Scotland Gas Managers Association, and given in the JOURNAL for June 1 (Vol. XXXV., p. 840), upon that table, and that more recently published by the Metropolitan Gas Referees.

At the time when Mr. Wright invented his table, there was not one scientific man able to contradict it, based as it was upon the accepted data of those days. Then it was agreed that a gas increases 1-480th part of its volume at 32° Fahr. for every degree of added temperature; but more recent researches by Regnault and others have shown that this rate of dilatation of gases should more properly be 1-492nd. Some three or four years ago you were good enough to publish a statement of mine to this effect, with a corrected formula for calculating a new table; and, if my memory is not at fault, you remarked that it was a pity I had not time for re-calculating the table. Last year, possibly on account of this statement of mine, the Gas Referees published a new table, calculated from the formula Mr. Niven quotes—

$$\frac{17{\cdot}64\ (h - a)}{460 + t}$$

I do not think I am wrong in attributing this formula, and the new table, to Mr. Vernon Harcourt, who is a high authority. This formula takes cognizance of the pressure exerted by aqueous vapour at varying temperatures (for coal gas is usually measured over water). Now, my father in his table ignored this, and justly so, I think, for his table was for the use of practical men, who would not care to be bothered by the highest scientific refinements. His table was, however, then beyond criticism for dry gases. If you will allow me, I will explain to your readers how the formulæ in ordinary use are arrived at.

In the first place as to pressure: By Boyle's law, the volume of a portion of gas varies inversely as the pressure, temperature being constant. Calling volume V and pressure P, the temperature being constant, the product of V P is constant. In the second place, as to temperature: By the law of Charles, thus stated by Clerk-Maxwell, the volume of a gas under constant pressure expands when raised from the freezing to the boiling temperature, by the same fraction of itself, whatever be the nature of the gas.

Here it would be well to call attention to the air thermometer, the action of which will, perhaps, explain to Mr. Niven some fact or principle in chemical physics of which he is apparently unaware, and will show him how the number 460 is obtained—a number which puzzles him exceedingly. The air thermometer has played an important part in thermodynamics, and has very much simplified the formula for adjusting volumes of gas, under various conditions of pressure and temperature, to standard. The air thermometer is a tube of uniform bore, sealed at one end, and containing a column of dry air disconnected from the outer atmosphere by a short column of mercury, which moves freely with the changes of the contained air.

We will suppose the pressure on the column of air to remain constant during the following changes:—Conceive the air thermometer immersed in a mixture maintained at 32° Fahr., and the volume of the contained air to measure 1; then conceive the thermometer immersed in steam from water boiling under standard conditions, and according to Regnault the volume should now measure 1·3665, but probably 1·366. I adopt this last figure in preference to the former. The problem now is:—Taking freezing point at 32° (1), and boiling point at 212° (1·366), find the temperature expressed at the bottom of the tube by continuing the Fahrenheit scale to that point. A simple calculation will show that it would be − 460° Fahr. Let us shift the zero to the bottom of the tube and scale upwards on the Fahrenheit system, and the freezing point will consequently be on the new scale + 492. Temperature expressed on this scale is termed by scientific men absolute temperature.

The rule, then, for converting ordinary readings on the Fahrenheit scale to absolute temperature in Fahrenheit degrees is to add 460°.

The object now to be attained is to condense the laws of Boyle and Charles into one simple expression. Clerk-Maxwell neatly combines them in the following expression:—"The product of the volume and pressure of any gas is proportional to the absolute temperature." Let V, P, T, be the observed volume, pressure, and temperature on the absolute scale, and V° the volume at standard pressure P°, and standard temperature T° on absolute scale; then—

$$\frac{V\,P}{T} = \frac{V^\circ\,P^\circ}{T^\circ} \qquad (1)$$

$$V^\circ = V\,\frac{P}{P^\circ}\,\frac{T^\circ}{T} \qquad (2)$$

$\frac{T^\circ}{P^\circ}$ is a constant quantity, and if the standards be 30 inches barometer and 520° thermometer, the standard absolute temperature becomes 17·333, and the formula for dry gases

$$\frac{V\,P\ 17{\cdot}333}{T}$$

But coal gas is usually measured over water; and if it be considered necessary to correct for the varying pressure exerted by water vapour at various temperatures, we must slightly modify the above formula, as Mr. Vernon Harcourt has done in the recent Gas Referees Instructions. The original formula can be used if it is understood that P represents the observed pressure *minus* the tension exerted by water vapour at the temperature T; and P° the standard pressure *minus* ·5178, which is the tension of water vapour at the standard temperature 520° (460° + 60°).

The Gas Referees formula (preserving the symbols) is—

$$V^\circ = V\,\frac{P}{T}\,\frac{520}{30 - {\cdot}5178} = V\,\frac{P}{T}\ 17{\cdot}64$$

Mr. Niven's formula is useless, for, firstly, it does not apply to changes of pressure; and, secondly, it is wrong, as I will prove.

The second reason remains to be proved. Owing to the rather hazy form of the problem, I could not at first detect where Mr. Niven had been led into an error, which I shall shortly point out. Let us first take his own example: "1000 feet at 50° Fahr., what is the volume at 60° Fahr.?"

$$\frac{1000 \times 502}{492} = 1020 \text{ feet.}$$

If I might be allowed to extend the answer to the nearest first decimal, the answer will be 1020·3 feet. An old edition of Fowne gives the answer to the same problem as 1019·6 feet. The formula I give above for dry gases also gives 1019·6 as the answer. The following reasoning from Fowne will elucidate the difference:—"The rate of expansion is 1-460th of the volume at 0° for each degree; or 460 measures at 0° become 461 at 1°, 462 at 2°, 460 + 50 = 510 at 50°, and 460 + 60 = 520 at 60°." Hence—

Meas. at 50°.		Meas. at 60°.		Meas. at 50°.		Meas. at 60°.
510	:	520	=	100	:	101·96

It will be seen that Mr. Niven has fallen into the singular error of taking the rate of expansion at 1-492nd of the volume at any temperature whatever, whereas the rate of expansion varies with the temperature at which the volume is measured.

Mr. Wright's table has, I believe, been used by every gas tester in the country for many years, and by the Gas Referees to within a very recent date, saving vast labour to all concerned in gas manufacture, and it is doubtful whether but for him any such table would be in use. Now that the coefficient of dilatation of gases has been altered, the table is to be contemptuously kicked out of office without a word of gratitude for long service, because the extreme ends of the table vary ·12 per cent. from modern data. Are photometer testings to be trusted to within ·12 per cent.; or station-meters, are they equally to be trusted? I can assure Mr. Niven that Mr. Wright and Mr. John Imray, M.A., who published a mathematical investigation of Mr. Wright's formula, and Mr. Vernon Harcourt, M.A., thoroughly understood the subject. "This goes without saying."

In justice to the memory of Mr. Alexander Wright (who died just about the time when Regnault's researches were published), I trust you will publish this explanation.

LEWIS T. WRIGHT.

Beckton, June 30, 1880.

LIEGEL'S REGENERATOR FURNACES.

We have received from Herr A. Kloenne, of Dortmund, a letter, of which the following is a translation:—

SIR,—While staying in London lately I noticed in the JOURNAL of the 22nd ult. two drawings of furnaces which are there called "Liegel's Regenerative Furnaces." Permit me to say that these furnaces do not properly belong to the class of gas generators; they are simply what may be called "open fires."

Referring specially to the drawings, I beg to say that as far as Fig. 1 is concerned, this furnace, with the exception of the grate, is an exact copy of one of those of my earliest construction, which I abandoned long ago.

Fig. 2 is to some extent a copy of my latest improvement in gas furnaces, which has been much approved of, and is largely adopted in Germany, though the arrangement represented does not contain its principal advantages.

A. KLOENNE.

Dortmund, July 1, 1880.

[On receiving the drawings which have been promised us by our correspondent, we shall take an early opportunity of placing them before our readers.—ED. J. G. L.]

MR. METHVEN'S TEST FOR ILLUMINATING POWER.

SIR,—I beg to submit a few tests which I have taken on Mr. Hartley's improved photometer, using an extra experimental meter to measure the gas consumed, a slice of which equals two candles. On each end of the rail is fixed one of Sugg's 15-hole 16-candle Argand burners, with a 7-in. by 2-in. chimney. The centre of the slice fixed on my left hand is 2 inches above the perforated face of the Argand, and 1¼ inches from the side of the chimney:—

No. of Test.	Gas consumed during Ten Minutes, a slice out of which equals 40 Grains.	Average of Ten Observations, one taken each Minute.	Gas consumed during Ten Minutes.	Reduced to Standard Candles.
1	·759 cubic feet.	13·97	1·012 cubic feet.	23·00
2	·883 „	12·06	·769 „	26·10
3	·457 „	9·05	·889 „	16·95
4	·888 „	10·47	·674 „	25·85
5	·808 „	12·54	·885 „	23·60
6	·576 „	8·56	·887 „	16·05

Candles cannot be kicked out as the standard for testing the illuminating power of gas in the face of such possible irregularities as these.

W. LYON.

July 8, 1880.

MR. W. ROMANS, lately with the Sheffield United Gaslight Company, was last week selected, out of 80 candidates, for the post of Gas Manager at Rochdale, vacant by the appointment of Mr. T. O. Paterson to the engineership of the Birkenhead Corporation Gas-Works.

FARINGDON GASLIGHT AND COKE COMPANY, LIMITED.—A Company under this title was registered on the 1st inst. with a capital of £3300, in 330 shares of £10 each. The Company was originally constituted by deed in 1835.

Parliamentary Intelligence.

PRIVATE BILLS RELATING TO GAS, WATER, Etc.

SESSION 1880.

PROGRESS MADE TO SATURDAY, JULY 10.

Title of Bill.		Petition for Bill Presented.	Bill Read the First Time.	Bill Read a Second Time.	Bill Reported.	Bill Read the Third Time.	Bill Received Royal Assent.
Ackworth, Featherstone, Purston, and Sharlston Gas Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" " "	Commons	Feb. 9	Feb. 10	March 8	June 15	June 24	..
Birkenhead Borough Bill	Lords	Bill with-	drawn.				
" "	Commons						
British Gaslight Company, Limited (Staffordshire Potteries) Bill	Lords	Feb. 10	Feb. 10	Feb. 23	June 17	June 22	..
	Commons	Lords Bill.	June 24	July 5	..	..	..
Burton-upon-Trent Corporation Bill	Lords	Comns. Bill	May 27	June 4	..	..	..
	Commons	Feb. 9	Feb. 10	Feb. 16	March 11	May 25	..
Cardiff Water Bill	Lords	Feb. 10	Feb. 10	Feb. 20	March 8	March 11	June 29
" "	Commons	Lords Bill.	March 11	May 31	June 11	June 15	
Chester Gas Bill	Lords	Comns. Bill	March 12	March 19	June 4	June 8	June 29
" "	Commons	Feb. 9	Feb. 10	Feb. 24	March 2	March 11	
Cork Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 1	June 18	..	..
Cork Improvement Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 15	June 24	..
Dagenham and District Farmers (Optional) Sewage Utilization Bill	Lords	Comns. Bill	July 9	..	..	..	..
	Commons	Feb. 9	Feb. 10	Feb. 17	June 15	..	..
Dartford Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 15	July 6	..	..
Dearne Valley Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	March 16	May 25	..
" "	Commons	Lords Bill.	May 28	June 15	June 22	July 5	..
Denton and Haughton Gas Bill	Lords	Comns. Bill	June 1	June 10	June 18	June 22	June 29
" "	Commons	Feb. 9	Feb. 10	Feb. 16	March 17	May 31	
Doncaster Corporation Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	March 16	May 25	June 29
" "	Commons	Lords Bill.	May 28	June 8	June 22	June 25	
Eastbourne Gas Bill	Lords	Comns. Bill	May 27	June 8	June 24	June 28	July 9
" "	Commons	Feb. 9	Feb. 10	Feb. 25	March 12	May 25	
Edinburgh and District Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	Feb. 26	March 2	June 14
" "	Commons	Lords Bill.	March 5	March 15	June 1	June 10	
Exmouth and District Water Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" " "	Commons	Feb. 9	Feb. 10	Feb. 23	June 11	June 24	..
Gaslight and Coke, Commercial Gas, and South Metropolitan Gaslight and Coke Companies Bill	Lords	..	..	..	..	..	..
	Commons	Feb. 9	Feb. 10	Feb. 17	July 9	..	..
Great Yarmouth Water Bill	Lords	Comns. Bill	July 6	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 1	June 25	July 5	..
Hinckley Local Board Gas Bill	Lords	Comns. Bill	July 8	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 8	June 29	July 8	..
Huddersfield Tramways and Improvement Bill	Lords	Comns. Bill	June 25	July 5	July 8	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 14	June 24	..
Hull Lighting Bill	Lords	Comns. Bill	June 29	July 9	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 11	June 28	..
Hyde Gas Bill	Lords	..	..	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 23	June 14	Preamble	not proved.
King's Lynn Corporation Bill	Lords	Comns. Bill	July 6	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 9	July 5	..
Lancashire County Justices (Water, &c.) Bill	Lords	Feb. 10	Feb. 10	Feb. 16	March 11	March 13	June 29
" "	Commons	Lords Bill.	March 16	June 7	June 15	June 24	
Lancaster Corporation Bill	Lords	Comns. Bill	June 18	June 28	July 6	July 9	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	March 12	June 18	..
Lincoln Gas Bill	Lords	Comns. Bill	June 22	July 6	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 12	June 8	June 21	..
Liverpool Corporation Water Bill	Lords	Comns. Bill	July 8	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 24	July 1	July 8	..
Liverpool United Gas Bill	Lords	Comns. Bill	May 28	June 7	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 24	March 12	May 27	..
London Gaslight Company Bill	Lords	Comns. Bill	June 29	July 8	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 1	June 17	June 28	..
Maidstone Gas Bill	Lords	Comns. Bill	July 2	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 23	June 22	July 1	..
Malton Gas Bill	Lords	Comns. Bill	June 25	July 5	July 8	..	..
" "	Commons	Feb. 9	Feb. 10	March 8	June 11	June 24	..
Oldham Improvement Bill	Lords	Comns. Bill	July 6	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 17	July 5	..
Phœnix Gaslight and Coke Company Bill	Lords	Bill with-	drawn.				
" "	Commons						
Portmadoc Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	May 31	June 3	..
" "	Commons	Lords Bill.	June 4	June 14	..	..	..
Prescot Gas Bill	Lords	Comns. Bill	May 28	June 7	June 14	June 17	June 29
" "	Commons	Feb. 9	Feb. 10	Feb. 23	March 12	May 27	
Preston Improvement Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	June 15	June 25	..
Rathmines and Rathgar Township (Vartry Water Supply) Bill	Lords	Feb. 16	Feb. 16	March 11	June 7	Preamble	not proved.
	Commons						
Rathmines and Rathgar Township Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	June 7	June 14	..
" "	Commons	Lords Bill.	June 18	June 29	..	..	..
Reading Gas Bill	Lords	Comns. Bill	June 29	July 8	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 1	June 17	June 28	..
Rochester Corporation Bill	Lords	Comns. Bill	July 9	..	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 16	July 2	July 9	..
Sea Water Supply to London Bill	Lords	Feb. 10	Feb. 10	Feb. 16	March 2.	Preamble	not proved.
" " "	Commons						
Sligo Borough Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	June 11	June 15	..
" "	Commons	Lords Bill.	June 17	June 28	..	..	..
South Metropolitan Gas Company Bill	Lords	Bill with-	drawn.				
" "	Commons	Feb. 9	Feb. 10				
Southwark and Vauxhall Water Bill	Lords	Bill with-	drawn.				
" "	Commons	Feb. 9	Feb. 10	Feb. 23			
Stafford Borough Bill	Lords	Comns. Bill	June 3	July 1	July 5	July 9	..
" "	Commons	Feb. 9	Feb. 10	Feb. 23	March 17	June 1	..
Wakefield Corporation Water Bill	Lords	Feb. 10	Feb. 10	Feb. 16	March 11	March 16	July 9
" "	Commons	Lords Bill.	March 18	June 7	June 25	July 7	
Wandsworth and Putney Gas Bill	Lords	Comns. Bill	June 25	July 5	July 6	July 9	..
" "	Commons	Feb. 9	Feb. 10	March 2	June 8	June 24	..
Wigan Improvement Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" "	Commons	Feb. 9	Feb. 10	Feb. 17	June 11	June 24	..
Wrexham Water Bill	Lords	Comns. Bill	June 22	July 1	July 2	July 6	..
" "	Commons	Feb. 9	Feb. 10	March 4	June 11	June 21	..
Yeadon and Guiseley Gas Bill	Lords	Comns. Bill	June 25	July 5	..	..	..
" "	Commons	Feb. 9	Feb. 10	March 10	June 11	June 22	..

HOUSE OF LORDS.

TUESDAY, JULY 6.

Petitions against the Hull Lighting Bill were presented from (1) Sutton, Southcoates and Drypool Gas Company, (2) Kingston-upon-Hull Gaslight Company.

THURSDAY, JULY 8.

The Ackworth, Featherstone, Purston, and Sharlston Gas Bill, the Preston Improvement Bill, and the Wigan Improvement Bill were referred to a Select Committee, consisting of Earl Camperdown (Chairman), Viscount Leinster, Lord Clanwilliam, Lord Hatherton, and Lord Haldon; to meet on Tuesday, July 13.

GAS and WATER ORDERS CONFIRMATION BILL.—The opposition to the Holywell Gas Order was withdrawn.

FRIDAY, JULY 9.

LOCAL GOVERNMENT (GAS) PROVISIONAL ORDER BILL.—This Bill received the Royal Assent by Commission.

GAS AND WATER ORDERS CONFIRMATION BILL.—This Bill was reported without amendment.

HOUSE OF COMMONS.

MONDAY, JULY 5.

A petition against the British Gaslight Company, Limited (Staffordshire Potteries) Bill was presented from the Corporation of Hanley and consumers of gas in the district.

A requisition to withdraw their petition against The Gaslight and Coke, Commercial Gas, and South Metropolitan Gaslight and Coke Companies Bill was presented from the Metropolitan Board of Works.

FRIDAY, JULY 9.

PROTECTION FROM FIRE IN THE METROPOLIS.

Sir H. SELWIN-IBBETSON asked the Under-Secretary of State for the Home Department if he could assure the House that, before coming to any decision on the result of the inquiry now going on before a Committee of the House on the question of the Water Supply of London, the Government would consider the report of the Fire Brigade Committee of 1876, and the recommendations contained in their report for the better protection of life and property from fire in the Metropolis.

Mr. PEEL said that, whatever might be the result of the pending inquiry into the Water Supply of London, the question of the supply for extinguishing fires must be involved in any decision that might be finally come to. The Metropolitan Fire Brigade Committee, over which the honourable baronet presided, reported in 1877, and among their principal conclusions were recommendations for the transfer to the Police of the duties of the present Fire Brigade, and for the amalgamation in one authority of the Water Companies. The transfer of the Water Companies to a public authority, or Water Trust, was the very question which was now being considered by the Committee of which his right honourable friend the Secretary of State was Chairman, and their recommendations must necessarily be a primary consideration in connection with the Water Supply of the Metropolis. In any case, he could promise the honourable baronet that the recommendations of the Committee over which he presided should receive the attention to which they were eminently entitled.

THE GAS EXPLOSION IN TOTTENHAM COURT ROAD.

Mr. FIRTH gave notice that on Monday, July 12, he would ask the President of the Board of Trade whether the Board have jurisdiction to institute an inquiry into the causes and circumstances of the recent gas explosion in Tottenham Court Road; and, if so, whether it is their intention to institute such inquiry.

HOUSE OF COMMONS COMMITTEE.

TUESDAY, JUNE 15.

(*Before Mr.* DODDS, *Chairman; Mr.* SCHREIBER, *Mr.* J. M'CARTHY, *and Mr.* NORTHCOTE; *Sir* JOHN DUCKWORTH, *Referee.*)

MAIDSTONE GAS BILL.

Mr. POPE, Q.C., Mr. LITTLER, Q.C., Mr. MICHAEL, Q.C., and Mr. CHANDOS LEIGH appeared for the promoters; Mr. CLERK, Q.C., Mr. DUGDALE, and Mr. KINGSFORD for the Corporation of Maidstone, petitioners against the Bill.

Mr. MICHAEL, in opening the case for the promoters, said the Maidstone Gas Company were incorporated in 1823, but the Act under which they were at present supplying gas was obtained in 1858. The capital of the Company was divided into three classes of shares—first, £12,500 A shares, entitled, if it could be earned, to a dividend of 10 per cent.; secondly, £12,500 B shares, only entitled to divide 4 per cent.; and thirdly, by the Act of 1858, the Company obtained power to raise £25,000 at 7½ per cent., making a total of £50,000, with borrowing powers of one-fifth that amount —viz., £10,000. The illuminating power was fixed at 12 candles, and the maximum price at 6s.; a public lighting clause was also introduced by which the Local Authority were to be charged the lowest average price, and there was an arbitration clause in case of difference. The limits of the Company were 3 miles from the Town Hall, and they had power to take land not exceeding 6 acres. The population of Maidstone in 1851 was 20,801, while at present it was 30,000, and the rateable value was £106,000. The Company now proposed to take, by agreement, a small piece of land contiguous to the existing works, with a siding on one side to the South-Eastern Railway, and also with facilities to get to the River Medway. They proposed to alter their limits to 4 miles instead of 3; and also to consolidate their capital into one of 7 per cent., in order to avoid the difficulties of working out the dividend on all the various shares, but imposing no new burden upon the consumers, because they proposed a uniform 7 per cent. It was also proposed to raise a further capital of £80,000 with borrowing powers to the extent of £20,000. In order to prevent the injustice to the urban part of the district by supplying gas in a radius so far off as 4 miles at the same price, the Company proposed to charge 1s. per 1000 feet extra beyond 3 miles, on account of the extra cost. The illuminating power was fixed by the Bill at 14 candles instead of 12, with a standard price of 4s. instead of 6s.; and provisions were inserted enabling the Company to provide and let out on hire gas stoves and engines, it being found that the prime cost of such stoves often prevented persons, who would otherwise be glad to use gas for heating purposes, from doing so. They likewise took power to supply gas in bulk, in order that outside places might have the opportunity of taking it from them and then distributing it within their own districts. The Corporation of Maidstone in their petition objected to the proposed limits as being far too wide, but the additional shilling would more than cover the extra expense, and would also ensure a profit which would go towards reducing the price in the borough. They also objected to the proposed capital; but this was a thing with which the gas consumers had nothing to do, owing to the operation of the auction clauses. It had very often been alleged, but never proved, that gas companies improperly expended capital. The Company were anxious to carry on their undertaking in the best possible way in the interests of the Shareholders; but if they expended capital unnecessarily, they diminished the value of their property, and therefore the dividends paid to the Shareholders. The petitioners also objected to the standard price proposed in the Bill, and said that "if the price were fixed at 4s. with the sliding scale, as proposed in the Bill, the Company would, at the present price charged for gas in the borough, make a dividend of 9¼ per cent. instead of the dividend of 7 per cent. now paid." This was based on an utter fallacy. They had gone upon the difference between the present price of 3s. 3d. and 4s., which was a difference of 9d., and then they had added 2¼ per cent. to the 7 per cent., and made it 9¼ per cent., as if that were the only amount of capital which was going to be influenced. Then they said that the Bill did not provide for the allowance of discounts to large consumers; but only the previous day a case occurred where the Local Authority contended for exactly the opposite. So the whole thing amounted to an absurdity, and the Corporation did not seem to have mastered what was the operation of the sliding scale, which took away the possibility of having those large discounts and rebates, and made it to the interest of the Gas Company to charge the lowest price. The petition next alleged that the Bill ought to limit the amount and application of the reserve-fund, which it did not do; but this was a total misapprehension of the working of that fund, which was an amount put by for the equalization of dividends, and belonged in reality to the Shareholders. The Corporation then objected that an illuminating power of 14 candles was not high enough, and that it ought to be 16 at the least. If they were willing to pay 3½d. extra for 16 candle gas they could have it. In two-thirds of the empire 14-candle gas was thought sufficient; but if at Maidstone something better was required it must be paid for. For heating purposes, however, 14-candle gas was more suitable than 16, and it would be much better for the general consumer to have the former at a lower price than the latter at a higher price. The next statement was, "That with respect to purity the Bill ought to provide that the gas manufactured by the Company should be wholly free from sulphuretted hydrogen"—a totally unnecessary allegation, seeing that the Gas-Works Clauses Act of 1871 imposed this obligation upon the Company, that the gas "should not contain more than 20 grains of sulphur in any form in 100 cubic feet." Witnesses would be called on this point, and they would prove that to carry out this limitation would cause great difficulty and possible nuisance. There were only two or three companies in the country, excepting the London Companies, who were limited with respect to sulphur; at the same time, if the Corporation wished it, the Company were perfectly willing that the Committee should insert in the Bill a reasonable quantity of sulphur which should be allowed in the gas. It was next asked that the hours during which the gas should be tested might be between nine o'clock in the forenoon and eleven in the evening; that the testing-place should be the public baths in the borough; and that the test might be made without two hours previous notice to the Company as proposed by the Bill. Various reasons would be given why it was not judicious that these requests should be granted. In the first place, the times mentioned were absurd, because during the day there was a very small amount of pressure, and it was in the evening that it was essential the testing should take place. With regard to the two hours notice, it appeared as though the petitioners thought the Company had during this time some power of doctoring up the gas, and making it represent improperly that usually supplied. It was, however, found necessary that two hours notice should be given, as it was essential that some of the officers of the Company should be at the place of testing, in order to avoid the difficulties which might arise owing to conflict of testimony. That was really the whole of the petition, and it resolved itself into two or three points which the Corporation might have settled with the Gas Company, without the trouble and expense of appearing before the Committee. The promoters were still willing to make any concessions which were fair and just, and were prepared, even at that moment, to listen to anything the Corporation had to say. Evidence would now be called to prove that what was asked was not only in the interest of the Company, but also in the interests of the consumers, and that it was essentially necessary in order to enable the Company to fulfil the obligations Parliament had placed upon them.

The following witnesses were then called:—

Mr. *Edward Hoar*, examined by Mr. CHANDOS LEIGH.

I am Clerk to the Maidstone Gas Company, which was originally established in 1823, although they first obtained parliamentary powers in 1858, and from that time till now no application has been made for additional capital. The amount authorized by the Act of 1858 was £50,000, and £10,000 borrowing powers, the whole of which has been raised, and in addition the bankers account has been overdrawn to the extent of between £4000 and £5000. The present population of Maidstone is about 30,000, and the number of inhabited houses about 5500. The limits of the Act include the parish of Maidstone, and also the district within three miles of the Town Hall, and certain other places named in the Act. The rateable value for poor-rate is £106,000. The maximum dividend on the present share capital amounts to £3625, which is at the rate of 7¼ per cent. on the £50,000. We propose to convert this capital into stock, carrying a uniform dividend of 7 per cent., which would be equal to £51,785. We have found three classes of shares an inconvenient system, and propose by the present Bill to consolidate them into one stock, bearing a uniform dividend. The price of gas at Maidstone is the lowest in the county of Kent, with two exceptions—viz., Rochester and Canterbury. Beyond the radius of three miles from the Town Hall of Maidstone there are several minor towns or villages, which are supplied from small gas-works at each place, but we propose supplying gas in bulk to those places, and this will be better and cheaper for them. At Hollingbourne the charge for gas is 7s. 6d. per 1000 cubic feet, and the consumption 1,026,500 feet; West Malling consumes 2,420,000 feet at 6s. 6d.; at Wateringbury I do not know the amount, but the price is 9s. Those small companies have signified their willingness to take our gas in bulk. The maximum price under our present Act is 6s. per 1000 feet, and the illuminating power 12 candles, although we are supplying 14 candles and upwards.

WEDNESDAY, JUNE 16.

Mr. *Hoar* recalled, and cross-examined by Mr. DUGDALE.

Our proposal is to serve gas in bulk into the gasholders in the small towns and villages. The Maidstone Company have been paying their full dividends whilst they have been overdrawing their bankers account; but I cannot answer the question why they did not pay their debts before they paid their dividends. At the present time the shares are bought to pay about 5 per cent. in the rough.

By the COMMITTEE: I cannot answer any questions with regard to the accounts of the Company.

Mr. LITTLER said there had been some negotiations which he hoped would have had the effect of shortening the inquiry. The promoters were prepared to make certain concessions which ought to satisfy the Maidstone Corporation. The standard price proposed by the Bill was 4s. per 1000 cubic feet for gas of 14 candles illuminating power, and the only other question was the number of grains of sulphur.

The CHAIRMAN: I think 20 grains are proposed.

Mr. LITTLER said this was so. The Company, however, were willing that the standard price should be 3s. 10d., and the illuminating power

15 candles. They were also willing to agree that, if they were allowed 25 grains of sulphur in the winter, they would limit themselves to 20 grains in the summer, there being a difference between the standards of the inner and outer rings. If that offer were not accepted, the Committee would have to decide whether the Company ought even to accept a price of 4s. per 1000.

Mr. DUGDALE (in reply to the Chairman) said those were not the only points in dispute. There was a question of capital and limit of district; also of the place and time of testing, and the limitation of the reserve-fund.

Mr. LITTLER said any place of testing might be fixed that the Committee thought reasonable. The reserve-fund came out of property which might have been divided. With regard to capital, there were the auction clauses, and therefore he should scarcely have imagined that this would at all affect the Corporation. The Gas Company desired to be friendly with the Corporation, and therefore made them a liberal offer for the sake of friendship.

Mr. DUGDALE said he was afraid the case must go on.

Mr. LITTLER thereupon said the Company withdrew their offer, and the Corporation must take the consequences.

Mr. *William Lawrence*, examined by Mr. LITTLER.

I am one of the Directors of the Maidstone Gas Company, and am a large consumer of gas at my business premises. At Hollingbourne, where I reside, there are some small gas-works owned by a Company not under parliamentary powers, of which I am Chairman. Our sale is a little over a million feet per annum, and the price 7s. 6d. per 1000. We cart coals out of Maidstone at a cost of 3s. per ton. It would be a great advantage if we could be supplied in bulk from Maidstone, as we should be able to reduce the price, and also obtain gas of a superior quality.

Cross-examined by Mr. DUGDALE: The expense of laying down a main to join Hollingbourne to the Maidstone Company would be about £400 or £500.

Mr. *Ambrose Warde*, examined by Mr. LITTLER.

I have been Chairman of the Maidstone Gas Company for the past 15 years. During the last few years our works have been largely increased, but are now inadequate to meet the demand for gas, and it is therefore necessary to have more land and more capital. About 7¾ acres of ground have been privately bought for 5000 guineas, and this will be transferred to the Company when they have power to take it. [Witness pointed out the position of the land on a plan.]

Examination continued by Mr. MICHAEL: We have recently erected a new retort-house, to contain 172 retorts, fitted up with West's patent machinery, which enables gas to be readily and economically made. It is also indispensable that we should have at once a new gasholder, which will cost from £10,000 to £12,000. We likewise require a governor-house and other offices, and stables, and a covering for an exhauster and purifier. We have had an application from Wateringbury for a supply of gas. I consider that an extension of the limit of supply to four miles could be carried out without any injury to Maidstone. The conversion of capital into stock would be for our own convenience, and would not affect any one outside the Company. The standard price proposed is 4s. inside, and 5s. outside the radius. I do not think it right that there should be a series of discounts, neither do I think it would work well. We have always endeavoured to carry out our obligations to the consumers in a liberal manner, and have always supplied better gas than is required by Act of Parliament; we have likewise reduced the price from time to time. We did not earn our maximum dividend last year, but made up the deficiency from a small balance we had in hand.

Cross-examined by Mr. DUGDALE: Last winter we had only storage capacity for 440,000 cubic feet, and our make was 600,000 cubic feet per day. It is a fair calculation that there should be gasholder room enough for a day's consumption. We were obliged to keep making gas, instead of having it in store, and if anything had arisen at the works the town would have been left in darkness. During the last ten years the consumption at Maidstone has increased 8 or 9 per cent. per annum. Many people now take gas who did not previously do so, and it is also extensively used for cooking purposes. Our works are kept up in the best order, with the very latest improvements. From 1861 to 1869 we have written off various sums for wear and tear of works, amounting in the whole to £15,000.

Re-examined by Mr. MICHAEL: We think a differential rate of 1s. per 1000 feet will cover any additional expense we may incur in extending our mains.

By the COMMITTEE: In 1878–79 we expended the sum of £10,241 in building a new retort-house and other things, including land.

Mr. *John West*, examined by Mr. CHANDOS LEIGH.

I am an Engineer, and have been Manager of the Maidstone Gas-Works for eleven years, but am now Chief Superintendent and Gas Engineer to the Corporation of Manchester. When I first went to Maidstone the retort-house contained 120 retorts, which were worked on the old system; they were 15-inch circular retorts. The production of gas per day of 24 hours was about 6800 cubic feet per mouthpiece. The coal stores and the machinery adjoining the retort-houses were in a cramped position, and were very badly arranged.

The CHAIRMAN: I suppose there is no question that the works have been very much improved?

Mr. DUGDALE: We say that the works are in a most efficient condition, and that they can do more than they are doing now.

Examination resumed: I erected a retort-house capable of holding 14 benches of retorts, and containing 172 mouthpieces. The maximum make of gas last winter was 600,000 cubic feet, and we have two gasholders together capable of containing 440,000 feet. The coal stores will hold about 3000 tons of coal. The condensers, exhausters, washers, and scrubbers are capable of passing a million cubic feet of gas per day; in fact, everything is adequate except the gasholders and purifiers. We did anticipate the purifiers would last for some time to come; but supposing we are limited to 20 grains of sulphur per 100 cubic feet, they will not be adequate to meet the requirements. In the year ending June 30, 1879, we made 118,726,000 cubic feet of gas. An enlargement of gasholder capacity is very much required, because it is a matter of great difficulty to supply the town in winter, especially when fog comes on very suddenly. We already require an increase of 50 per cent. to meet the present consumption; but in view of the future I should recommend an increase of 100 per cent. The increase in consumption between 1868 and 1879 has been about 8 per cent.; in the former year it was 66,474,000 cubic feet, and in the latter 118,726,000 cubic feet. The proposed new gasholder would cost from £10,000 to £12,000, and would hold 500,000 cubic feet of gas. Its diameter would be 130 feet, but it is not yet decided whether it is to be a single or double lift holder. The cost of the land is not included in the sum I have mentioned. I have made out a tabulated statement of the additional items of expenditure which, in my judgment, will be required for the works, amounting in the whole to £48,965, including the overdrawn account at the bank of £4565, and the expenses of the Act we are now applying for, which are put down at £3000. We supply a very large number of stoves in Maidstone, both for cooking and heating. I consider the extension of the radius to four miles would be most reasonable, because the outlying districts are very small. With regard to the share capital, up to June 30, 1876, there had been raised the sum of £41,200, and we had received for premiums on the sale of shares, £1816 18s.; making together, £43,016 18s. Since that date £8000 has been raised by shares and £10,000 by loans, making a total on June 30, 1878, of £61,816 18s. Up to the same date the total expenditure had been £66,209 0s. 6d., showing the capital account to have been overdrawn to the extent of £4392 2s. 6d. The amount standing to the credit of the reserve-fund on the 30th of June, 1879, was £2227 12s. 4d., of which sum £2160 1s. 4d. has been invested in Consols. By our Act of 1858, we are entitled to a reserve-fund of £5000, so that £2772 7s. 6d. is still required to complete that fund. From June, 1875, to June, 1876, the price charged to private consumers was 3s. 6d. per 1000 feet, and for the public lights £3 10s. 3d. per lamp, including repairs, lighting, &c. From June, 1876, to June, 1879, the price was 3s. 3d. per 1000 to private consumers, and £3 6s. 6d. for the public lights, the average time of lighting being ten hours per night per annum. The increase in the gas made during the ten years, 1869-79, was 72·10 per cent., or an average of 7·21 per year. The increase in the gas sold for the three years ending June, 1879, was 26·15 per cent. The leakage in 1876 was 11·89 per cent., and in 1879, 10·92 per cent. The net profit for the year ending June 30, 1876, was £3930 18s. 10d., which works out to 11·38d. per 1000 cubic feet; during the year 1877 it was £3610 9s. 4d.; 1878, £3497 10s. 6d.; and 1879, £3187 15s. 11d., or 7·31d. per 1000 feet. Our maximum dividends on share capital in 1876 were £2910; 1877, £3047 10s.; 1878, £3593 6s. 4d.; and 1879, £3625. In 1879 we required for dividend 8·32d. per 1000 feet, but we had not sufficient within 1·40d. per 1000 feet. On June 30, 1879, there was a net balance in favour of the Company of £11,319 11s. 4d., out of which the dividend for the year had to be taken, amounting to £3625, reducing it to £7694 18s. 4d. A certain amount was then required to make up the reserve-fund to one-tenth of the nominal capital—viz., £2727—which reduces the amount to £4922 10s. 8d. Then there is the question of the suspense account, £2000, which leaves a net balance to be carried forward of £2922 10s. 8d.

Mr. LEIGH: What working capital, if any, is there in addition to this?

Witness: There is not any working capital. We have overdrawn our bankers account.

There is an item with reference to paying off the suspense-account—will you explain that?—I have already said that the works are very old, and incapable of meeting the requirements of the town. According to our Act of Parliament there is no allowance made for depreciation, and in this case the works did not have anything done to them for several years; but at length there came a time when the whole of them required renewing, and so we commenced, as soon as we purchased the land, to remove, as it were, from one end of the ground to the other, and the works were then diminished. In 1878, to give an illustration, a gasholder was pulled down to make room in the yard for storing our coke. This really should have been paid for out of the revenue for the year, but we could not do so; we therefore paid as much as possible in that year, and the remainder we call a suspense account, to be paid in future years out of revenue, because all such things ought to come out of the profits of the working of the concern. There was a sum of £600 charged in the repair and maintenance account during the year ending June 30, 1878, and another amount of £2400 charged to the same account for 1879, making a total of £3000 in those two years, of which there still remains £2000 to be taken out of profits. If we obtain our Act we want to start clear, and, therefore, this £2000 would be charged to revenue account, and taken out of the next available balance. I have prepared a tabulated statement with reference to the repair and maintenance, which is follows:—

As to Repair and Maintenance Accounts.

			Pence per 1000 Sold.
During the year ending June 30, 1876, there was expended on—			
Repair and maintenance of works	£3305 3 8	or	9·57
Repair and maintenance of mains and services	1052 4 3	,,	3·05
Repairing, renewing, and refixing meters	604 6 7	,,	1·75
			14·37
During the year ending June 30, 1877, there was expended on—			
Repair and maintenance of works	£4445 4 11	or	11·92
Repair and maintenance of mains and services	571 10 0	,,	1·53
Repairing, renewing, and refixing meters	410 14 10	,,	1·10
			14·55
During the year ending June 30, 1878, there was expended on—			
Repair and maintenance of works	£4829 15 1	or	12·28
Repair and maintenance of mains and services	494 19 7	,,	1·26
Repairing, renewing, and refixing meters	472 11 7	,,	1·20
			14·74
During the year ending June 30, 1879, there was expended on—			
Repair and maintenance of works	£5820 5 11	or	13·36
Repair and maintenance of mains and services	294 10 11	,,	0·68
Repairing, renewing, and refixing meters	559 8 10	,,	1·24
			15·28

In making out this statement, I have taken into consideration that the old works have been almost entirely demolished, which makes the account appear very heavy. In 1876 our old purifiers were pulled down, and in 1877 an old gasholder and iron tank were removed. The value of the materials sold was credited to the fixed plant account, and the balance credited to the repair and maintenance account. We have no provision for depreciation, and this necessarily makes the repair and maintenance account heavier. There was nothing done for many years, and the consumers reaped the advantage by getting cheaper gas. During the eleven years I was Manager, the Company most decidedly fulfilled all the obligations they were placed under by the Act of 1858. We are entitled by that Act to charge up to a 6s. maximum; but for the last ten years we have not charged more than 4s. 6d., while at present the price is 3s. 3d.

Mr. LEIGH said he had had placed in his hands a report by Mr. Adams, the Maidstone Corporation Gas Examiner, on the gas supplied by the Company during the years 1876 and 1877, giving the details of the illuminating power, the amount of sulphuretted hydrogen, and as to the presence of ammonia and sulphur.

The CHAIRMAN: This is with reference to the past supply of the Company, is it not?

Mr. LEIGH: It is a little more than that.

The CHAIRMAN: No allegation is made in the petition as to your conduct in the past; therefore how is it material?

Mr. LEIGH: The Corporation say: "We want to put a restriction and obligation on you—that is to say, 20 grains of sulphur; and, in addition, we make the allegation against you that in your gas there is sulphuretted hydrogen."

The CHAIRMAN said he thought the promoters were entitled to say that in the petition there was no allegation with reference to their conduct in the past.

Mr. Dugdale: We say we are not satisfied with the present state of things, but we want to have something better.

The Chairman said the Committee were willing to assume that everything had been well done up to the present time.

Mr. Leigh said they were doing better than their Act required.

Examination resumed: The illuminating power is on the average 14½ candles, which I think is the best in the whole district round Maidstone. We have no objection to there being a testing-place provided, so long as it is in one of the public offices and off one of the principal mains. We do not think it should be at the public baths, because there is only a small main there, and it is in a low district. The proposed differential charge of 1s. is to meet the extra expense of mains. The extended limits will not increase the cost of gas to consumers within the borough. We propose to keep up this difference, however much the price may be reduced. The price is liable to be affected by strikes, and increase in the cost of labour and materials; but in calculating our prices we leave a margin to cover contingencies. The price of coal at present is very low—14s. 4½d. per ton delivered at our works. We use 1 per cent. of cannel, which we get from Scotland; it is brought by sea to Rochester, and then barged up the River Medway. Our gas has always been free from sulphuretted hydrogen; and although we are under no restrictions as to sulphur and ammonia, the Company some time ago gave me instructions to arrange a set of purifiers for their removal, which received the approval of Dr. Odling, Mr. Keates, and Mr. Heisch, but which entailed a very large cost. By spending that money we have been enabled to partially but not wholly remove the sulphur compounds, because at present there is not sufficient apparatus. We have great difficulty at Maidstone, because in endeavouring to purify the gas we are obliged to engage barges, which cost us £4 per barge for every purifier we empty, and of course there is also the liability of causing a nuisance in the district. We can do almost anything at this season of the year, but in the winter, when the consumption of gas increases to 600,000 feet per day, the new purifiers are not adequate to meet the large quantity. It is therefore necessary, if the proposed sulphur clauses are imposed upon us, that a further extension of capital should be sanctioned. In our estimate £7000 is put down for purifiers. I am afraid that this is not all which would be necessary to secure what the Corporation require. They ask for only 20 grains per 100 feet, which is most difficult to secure in practice. Although we have tried every means, we have had great difficulty in controlling the sulphur, especially in the winter season. The Company are very desirous of meeting the Corporation, and doing everything which is reasonable and right on this subject, and we have no objection to come under some sulphur clause, but taking the cost into consideration, a difficulty crops up. In London the Referees fix the amount of sulphur according to whether the works are urban or suburban. Our works are situated on the Medway, and are surrounded by all classes of houses—on one side they are very good houses, and on the other side they are rather poor ones. In attempting to reduce the sulphur, complaints have been made of nuisance to the inhabitants. There were also complaints when I was endeavouring to work out a better scheme for purification, and I was stopped in what I thought would be an advantage.

Cross-examined by Mr. Dugdale: We have four purifiers 24 feet square, and four 14 feet square. There are two gasholders, each containing 220,000 feet. There could be no difficulty, from an engineering point of view, in putting up another gasholder of similar size to the two we have, instead of the one we purpose, but it would be very indiscreet for any one to recommend such a thing. At the present time our purifiers are adequate to our make, but I should not like to say how much increase upon our present consumption they are adequate to purify down to 20 grains. We find, however, that as we increase the velocity in these purifiers the purification does not work out proportionally. Our present purifiers cost us £6000. I entirely disagree with the notion that another £3000 would be sufficient to purify half as much again gas as is at present consumed, because to keep the sulphur down to 20 grains a larger number of purifiers will be required. We propose to put down four. It does not follow that double the number of purifiers would do double the amount of work; and this is the difficulty chemists have to contend with.

Mr. Dugdale: Surely you could arrange another set of purifiers to pass the gas partly through one set and partly through another set?

Witness: The difficulty of doing this would be the time the lime would require to remain in the purifier.

How is it that you have put in your estimate £7000 as the capital required for additional purifiers when you have really spent £6000 on the purifiers you have now in use?—I have included the foundations in the £7000, but the £6000 which I spent a few months ago only refers to the purifiers themselves.

In point of fact, at the present time, you can, and do frequently, purify down to as low as 10 grains of sulphur?—Yes.

There is no difficulty about it, if proper care is taken?—I am afraid there is.

It is done, at any rate?—It is done at the present time, but it could not be done in the winter with the present purifiers. There is something more than the capacity of the purifiers to be considered, because temperature also affects the question, and that we cannot control.

By the Committee: I think there are very few places like Maidstone where the sulphur restrictions are in force, and where the gas is tested by such an efficient examiner as we have.

Mr. Dugdale: What objections have you to the limit of 20 grains of sulphur?

Witness: Because of the liability of causing a nuisance in the district, and the expense that would be entailed in carrying it out.

Would not that equally apply to other towns which Parliament has placed under similar restrictions?—It should have applied, but, unfortunately, the restriction which has been imposed on them has been a sinecure.

By the Committee: By a sinecure I mean that the gas is not really analyzed. I could not say whether this is the case at Newcastle, but I should question very much whether the gas is tested there by the most perfect apparatus. I believe Wright's apparatus is used there, and this does not show the full amount of sulphur contained in the gas.

Mr. Dugdale: You do not mean to say that the Act of Parliament is allowed to remain a dead letter with regard to this testing?

Witness: I certainly do.

Cross-examination continued: Of the £6000 proposed to be expended on mains, about one-third would be required inside the town and two-thirds outside. The various extensions proposed to be made are very much required. We are anxious to have our Bill passed, to enable us to erect a station-meter house before the winter season; and the same remark applies with regard to the condenser and scrubber. Our offices are also exceptionally cramped; we have only one small room, where people give their orders, pay their money, and everything else. The Company have paid their full statutory dividends for the last 20 years. The decrease in profit in 1879 arose out of the works becoming too small, in consequence of which they were demolished.

Mr. Dugdale: I know the main object of every prosperous and well-managed gas company is to pay for everything out of revenue if it is possible?

Witness: They pay what is legitimate and fair. I maintain that all new works should be paid for out of capital, but that the works should represent the capital which is expended on them. That cannot be done every year; you are obliged to go, perhaps, four or five years without spending a penny.

Cross-examination continued: Our report for June, 1879, shows that in that year we spent £5990 5s. 11d. for repair and maintenance of works and plant; £294 10s. for mains and pipes; and £539 9s. 10d. for meters. The sum of £5990 includes the ordinary renewal of retorts, and part of the expenditure on new works, in respect of which the £2000 has been placed to the suspense account, and will come out of revenue at some future time. Assuming that the buildings which were demolished cost £5000, and that we obtained £500 for the old materials, the remaining £4500 should come out of revenue.

Mr. Dugdale: You do not mean to say that you would need £5990 for repair and maintenance in future years?

Witness: I do not think we should continuously.

Then your statement that there was a decrease of profit in 1879 was hardly, perhaps, founded on what you could expect to be the result in future years?—All gas companies ought to maintain their plant as a going concern, and the works should fully represent the amount expended on them.

When you made that statement did you wish the Committee to understand that the concern was rather going downhill, and that the Company were in rather a bad way?—I never thought anything about it in that respect.

Would it not have been fairer to have said that this was partly accounted for by the large amount you had spent on maintenance and repairs?—The repairs and maintenance are not exceptional for works of the size of ours.

Looking back to three years previously, you have spent a large sum?—It is a great advantage to the consumers and everybody else to maintain the works. In some places the principle has been to raise capital for everything that is required. This system has told very detrimentally in London.

Is it not the fact that during the last four years you have had a general renewal of your works?—Not only during those four years, but for some years previously.

So that instead of being worn-out works, requiring extensive repairs, they are in the finest possible repair, with the latest improvements, and in the highest standard of efficiency?—As far as they go, they are very good works, and will not require quite so large a sum to be spent on them in future years.

Why do you ask the Committee to give you a price of 4s. 3d. per 1000 feet and the sliding scale, while you are now making your full statutory dividend at 3s. 3d.?—In the first place, when we lowered the price to 3s. 3d. we were purifying the gas from sulphuretted hydrogen and ammonia. The Corporation then desired that we should take out the bisulphide of carbon, and the Company decided that they would endeavour to do so, but this caused a greater expenditure than was anticipated. The removal of the bisulphide costs about 2d. per 1000 feet, or about £1500 a year.

Setting this against extra expenditure for maintenance of works, you would be just as well off in future years as you are this year?—Yes; but that is all a question of price, and requires to be taken into consideration.

With regard to the sulphur, I have a return here, dated Jan. 14, 1880, from the Gas Examiner, stating that in the previous week there were 13·70 grains in 100 feet of gas. This would be a winter test, would it not?—That is just the difficulty we are in.

Would not the difference between the highest and the minimum depend on the care exercised in doing the work?—I do not think it would. That is not an average winter week's test.

By Mr. Leigh: In fixing an initial price, arrangements must be made for fluctuations in the coal market, and also in the sale of residual products.

By the Committee: If there is a good hop season we have a good sale for our coke, a large proportion of it being consumed in Maidstone and the hop-growing districts. A bad season would affect us to the extent of 1s. 1½d. per chaldron of 36 bushels.

Mr. Dugdale: In estimating the initial price, how much per 1000 feet do you leave for contingencies?

Witness: The calculation we have made is that the selling price is now 3s. 3d. per 1000 feet. There was a deficiency in last year's accounts of 1·41d. per 1000 feet, and added to this there was a sum of £10,000 which we borrowed on loan at 4 per cent. This will be capitalized, and incur a cost of 0·80d. per 1000 feet. Then we shall require for new gasholders and buildings an increase of capital of £45,000, which is 5·44d. per 1000 feet. Adding those together, they amount to 4s. 1·13d.; but we have estimated we might be a little better off, and have thrown out the 1·13d. I have not taken into consideration any increase of trade in the town, but this will not be much. The net profit we now make is 7·31d. on every 1000 feet of gas sold.

The result is—if your case is anything like accurate, and you continue to make gas pretty much at the same cost as you are making it now—that if the standard price is raised to 4s., while you are able to sell at 3s. 3d., you would be able to pay 9¼ per cent. dividend instead of 7 per cent. by the operation of the sliding scale?—By the present Bill we should.

Supposing the expenditure on the outside districts were not remunerative, the dividend would have to come out of the pockets of the consumers in the present limits of supply?—It would, if such were the case.

Supposing you are doing very well now, and making quite enough to pay your statutory dividends, or a little more, would it not be to the interest of the Company that they should rather spend money which would be unremunerative to a certain extent outside, and have a dividend on it, than not spend it at all?—I think not. The 1s. extra will fully meet the difficulties of the outer districts, and will entirely prevent any loss to the town itself.

Is it not generally to the interests of gas companies to increase their capital up to the maximum amount which their profits will enable them to pay dividends upon, particularly where there are negotiations for selling the works to a Corporation?—It is a bad thing to do, but I do not think it affects this question. We have acted rather the reverse of this, and probably against the interests of the Company.

Cross-examination continued: The burner used for testing the gas at Maidstone is Sugg's No. 1 "London" Argand burner. I have not found that this burner shows something like 2 or 3 candles better light than the old burner would show. If you go back to the old iron burner, you would probably get a candle less illuminating power.

Re-examined by Mr. Leigh: The differential price was put in because it was thought that the parties in the immediate neighbourhood of the works should not suffer from the outer districts. To construct one large gasholder instead of two small ones would be more economical both as regards space and cost.

In reply to the Chairman, witness said that the examination of the gas for sulphur compounds was made fortnightly. That made on Dec. 17 was 35·81 grains; Jan. 14, 13·73 grains; Feb. 25, 34·24 grains; March 10, 34·65

grains; March 24, 34·49 grains; April 7, 19·78 grains; April 20, 19·21 grains; May 5, 17·25 grains; May 19, 11·5 grains; June 10, 10 grains.

By Mr. LEIGH: I attribute these variations to the fact that our purifiers are not large enough to remove the whole of the sulphur compounds systematically. It is, therefore, hard upon us to insist upon the limitation to 20 grains. The Company are not represented when the Corporation tests are taken.

Mr. LEIGH: If the sulphur has to be eliminated, will there be an increase in expenditure so far as purification is concerned?

Witness: Yes.

Mr. DUGDALE: And, in addition, would there be an extra cost for an increase of illuminating power beyond the 14 candles?—Certainly there would; and we have not reckoned those items in our calculation.

By the COMMITTEE: One penny for the sulphur is the lowest price I think you can put, and 4d. for the two candles illuminating power. Some of our friends think it can be done for 1½d. per candle, but my estimate is 2d. My estimate of the consumption of gas in the extended district is from 8 to 9 million feet, but we do not know the exact quantity in one or two cases.

Mr. LEIGH called the attention of the Committee to the fact that the power of the Company to raise additional capital was contained in the 6th clause of the Bill, and said there was a proviso in the amended Bill that the Company should not create or issue, within the year following the passing of the Act, any greater nominal amount of capital than should be sufficient to produce, in the manner therein stated, £50,000. The calculation of expenditure made by Mr. West was upon this basis.

THURSDAY, JUNE 17.

Mr. *West* was recalled, and handed in a statement showing the estimated cost of the mains required in connection with the outlying districts, amounting in the whole to £6019 10s.

Examined by Mr. COOPER (in the absence of Counsel): The table also shows the amount that will be required to be expended within the present radius, in order to reach the limits of that radius For instance, taking the extension to West Malling, £135 would be expended in the old district, and £1072 10s. in the new; and it would be the same in the other cases. I have prepared a table showing the estimated quantity of gas required for the outlying districts, which is as follows:—

Maidstone Gas.

Estimated quantity of gas required for outlying district:—	
Hollingbourne	1,026,500
New Mills	1,000,000
Wateringbury	2,250,000
West Malling	2,000,000
Barham Court	250,000
Bearstead and large houses in line of main	1,500,000
	8,026,500 cub. ft.

1s. extra per 1000 = for 8,026,500 cubic feet, £401 6s. 6d.

Say £6000 expended on mains to produce above results.

This should be calculated at 5 per cent., as the premium on the capital required on account of this will form part of the outlay of £6000.

£6000 at 5 per cent.	£300 0 0
Allow for extra supervision, &c.	100 0 0
	£400 0 0

The calculation that the £6000 will be raised practically at 5 per cent. interest is owing to the operation of the auction clauses. The premium fund of £300 will be expended on future extensions of the works. I also allow £100 for extra supervision for the additional 8 million feet, making £400 in all.

Mr. COOPER: The £400 does not represent the only return you will get on that expenditure, but it is *plus* the profit you will obtain on the gas you will sell within the 8 million feet?

Witness: Yes.

By the COMMITTEE: We propose to supply the outlying districts with gas in bulk, because they will still have their distributory works.

By the REFEREE: From 1870 to 1873 the price was 3s. 6d. per 1000 feet, and the public lamps were charged for at £3 6s. per annum. In 1873 the price was 4s. 3d. per 1000, and £4 1s. 6d. per lamp; 1874, 4s. 6d. per 1000, and £4 5s. 3d. per lamp; 1875, 4s. per 1000, and £3 17s. 9d. per lamp.

[Witness was cross-examined by Mr. Dugdale at some length with reference to the details of the tables he had prepared, in the course of which he said that, in forming his estimates, he had taken into consideration the large houses in the district, and also the probable requirements, as it would not be right to lay down too small a main, and then find it was inadequate to meet the wants of the district.]

Mr. *Robert Paulson Spice*, examined by Mr. LITTLER.

I have known the Maidstone Gas-Works for several years past, and may say that they will be completely remodelled when the proposed extensions are completed. When I first knew the Company they were in a state of great difficulty with regard to the space they had to work in. The alterations and improvements which have been made are quite up to the present state of the knowledge of gas manufacture and the science of gas making. The Company's capital is small in proportion to the business done. They have always conducted their business on economical principles, not charging everything to capital, but paying something out of profits, as they thought they ought to. In my judgment the consumers of gas have really paid for some of the new works when the price might have been reduced.

A MEMBER of the COMMITTEE: In fact, the Company have been charging too much for their gas.

Witness: Yes, it comes to that. If they had found the capital for their extensions, instead of paying for them out of revenue, the price of gas might have been reduced a little lower; but virtually it cuts the other way, because the consumers of to-day are reaping the benefit of this extreme care and economy. I do not know of a gas company where the directors have more scrupulously and strictly carried out their duties, and I know a great many companies all over the kingdom.

Examination resumed: The present site of the works will be adequate when the Company have secured the extra land; otherwise it would not be adequate for future requirements, nor indeed for the present, because there is no room for additional gas storeage. The total capital required for apparatus and buildings within the next twelve months will be £48,900. as stated by Mr. West, whose figures I adopted. I think a standard price of 4s. per 1000 feet for Maidstone would be a perfectly reasonable one. It ought really to be 4s. 3d., but I knock off the 3d., depending on an extension of business. I think an extra price of 1s. per 1000 for the outlying districts would be both fair and profitable, and I advised the Company to that effect.

By the COMMITTEE: The Company required 3s. 4d. to pay their maximum dividend last year, although they only charged 3s. 3d. There was no reserve, but everything was advantageous to them at that time. They were working up to the full, so that the capital was unduly small in proportion to the business done; but such a state of things is at an end when it is seen that they must spend in round numbers £45,000. They would certainly have to pay a dividend of 5 per cent. on that amount at the end of the first year, and this alters the case altogether. It must be taken into account that the year before they were working under extraordinarily favourable circumstances—coals were cheap, and everything was to the advantage of the Company, but this will no longer continue. There is a necessity for providing for the wants of the undertaking to the extent of £48,000 in one year, and this will require an addition of 5·16d. to the price, and therefore the possibility of supplying gas at 3s. 3d. per 1000 feet vanishes entirely, according to my view, and I do not think it can be disputed.

Examination continued by Mr. LEIGH: I do not think the Company should be tied to a maximum of 20 grains of sulphur. My contention between the parties, with a view to effecting a settlement of this vexed question, was a latitude of 5 grains in 100 cubic feet of gas, and I think that is perfectly reasonable. I believe that chemists who support the case in this respect will say that 20 grains ought to be the standard. In London it is as much as 25 grains in the winter, and it cannot be expected that in a provincial concern there should be talent available to keep within the exact limits. The difficulty is not the capacity of the purifiers, but the want of knowledge, which I may say no living man possesses, of the true and exact nature of the material which affects the arresting of the sulphur compounds. It is lime in the first instance. Before it will arrest these compounds it must be saturated to a certain extent with the foul products, and when it has arrived at a certain stage of foulness, it lays hold of the sulphur compounds, and keeps them. But it is not long in that state. The operation of passing foul gas through it goes on, and it becomes supersaturated, so to speak. I have looked at the returns made by the chemists of the Corporation, and at Mr. West's own return; and I see there abundant evidence of the truth of what I now advance—that the thing is almost beyond control. I would not say it is beyond control if it were in the hands of a thoroughly well-educated chemist, who was at hand to see how the thing was going on, because it would then be merely a question of purifying power. He could always have the purifiers in a certain stage, his attention would be confined to it, and his knowledge would be equal to it; but no country gas manager ought to be placed in such a situation as to have his company liable to a heavy fine being imposed if 20 grains are exceeded. In the next place, I think it is absolute nonsense to stick up for 25 or even 30 grains, because I believe there is no injury to health likely to arise from breathing that amount of sulphur. There is no perceptible difference in breathing the air of a room which is illuminated by gas containing, say, 30 grains of sulphur compounds per 100 feet. It might just as well be 30 grains as 20 grains, so far as any practical results are concerned, and I make this statement scrupulously according to my belief. There is a difference between the winter and summer months. One day the sulphur test will show 11·13 grains, and the next day 35 grains, but no one knows why. I believe it would cost something like 1d. per 1000 feet additional if the sulphur compounds are limited to 20 grains. With regard to illuminating power, my opinion is that to supply 15 candles the Company must make 16. I put the extra charge at 1½d. per 1000 feet. If I am driven to 16-candle gas, the additional cost would be 2d. per candle.

The CHAIRMAN here inquired whether there was any probability of the offer made on the previous day being accepted by the opponents of the Bill.

Mr. POPE said his clients had done all they could, but his learned friend's clients evidently did not know what they wanted.

Mr. DUGDALE said if there had been a reasonable offer made it would have been accepted by the Corporation.

Cross-examined by Mr. DUGDALE: The Corporation have not considered their own interests at all, but those of the gas consumers, in seeking to keep the capital down.

Mr. DUGDALE: Is it to the interest of a gas company, when they have a limited dividend without the sliding scale, to keep their works up to the highest possible state of efficiency out of revenue, instead of reducing the price of gas to the consumers?

Witness: That is a fallacy.

Is it not also to the interest of gas companies, when they have a sliding scale, to pass on to capital everything that they can, consistently with being able to maintain their full increase of dividend?—I cannot agree with you on either footing. I think self-interest would dictate to a gas company to continually bring in capital upon which they could obtain 10 per cent. You may take it that the auction clauses have been devised in the interest of the consumers.

I see £80,000 is the share capital proposed to be raised by the present Bill. In point of fact, if this sum can be raised under the auction clauses to pay 5 per cent., as you assume it can, there will be an additional premium payable of £32,000 on the £80,000?—That is not correct, because we are not allowed to do so by law. The £80,000 to be raised includes the premiums.

Mr. DUGDALE: If that is so, I made a mistake.

Mr. POPE said it was not a mistake; it was merely the converse of the proposition. Instead of £80,000 *plus* the premiums, it was £80,000 in the whole, including the premiums.

Cross-examination resumed: Storeage for the gas must be provided and in a few years another retort-house will be required, for which there is no room on the present site. My rule is to provide for the daily supply, and the storeage should be equal to it. In some exceptional cases even more than that would be required—say, in manufacturing districts, where the great bulk of the gas is sent out in three hours. The Company have accommodation at present for 440,000 cubic feet of gas, while the average daily sale is 330,000 feet, or thereabouts. The proposed holder will be of a capacity of 500,000 cubic feet, but when building a gasholder it must not be constructed equal only to the daily make, otherwise another one would be required in the following year. If I were in Mr. West's position, I should provide for an increase of 10 per cent., because there would be something like 6 per cent. added at once for the additional districts, and 4 per cent. inside the town. In view of those increases, I am of opinion that the Company have not asked for enough capital; it would have been wiser to have asked for £100,000, and that would not carry them on long.

Mr. DUGDALE: Supposing the Committee did not think fit to sanction the supply to the outside districts, then you would have 4 per cent. increase inside, and that would double the present production in about 20 years, would it not?

Witness: It would go on faster than that. There is no reason why Maidstone should not follow what is now the normal rate of increase of 8 per cent. I must decline to be tied to 4 per cent., or any other rate.

I do not understand that there is anything in the special trade or population of Maidstone which would make the increase more rapid than it has hitherto been?—I believe the population has little or nothing to do with it. I have known places where the population has been stationary, and yet the consumption of gas has gone on increasing.

By the COMMITTEE: I think that an increase of 1s. per 1000 feet for the outlying districts will tend to increase the consumption of the Maidstone Company's gas, because the inhabitants there are now paying 7s., 8s., or 9s. per 1000 feet.

Mr. DUGDALE: I wish for a little further development of your standard

of 4s. We will say that at the end of 1879, with a price of 3s. 3d., the Company were earning their maximum dividends?—No; they were paying them, but they did not earn them. They were spending money and getting into debt, because they owed their bankers £4500.

How much, in your opinion, is usually reckoned per 1000 feet as sufficient for repair and maintenance of works?—That is a very variable thing. I have a case before me where it costs 2s., but if the works were new it would not require anything like that amount. At the largest works in the world—those at Beckton—it is 6·06d., against 13·36d. at Maidstone.

By the COMMITTEE: My opinion is that about 10d. or 11d. would be the average.

Mr. DUGDALE: If you look at the table which was handed in yesterday you will find the figures for the last four years—during which time the Company have been renewing the whole of their plant—14·37d., 14·55d., 14·74d., and 15·28d?

Witness: I find it was 9·57d., 11·92d., 12·28d., and 13·26d. I have therefore taken the most unfavourable year for myself.

So you see, on your own estimate, there ought to be a saving on the 1876 expenditure of about 3d. per 1000 feet?—About that.

Then for the year 1879, taking things to remain as they are, with the exception of the summer time, for repairs and maintenance, the price would stand being reduced from 3s. 3d. to 3s., and still give the maximum dividend?—No; there is 1d. short to begin with. If you are going to take advantage of the 4d., and call it 3d., I do not understand it, because every penny is an object.

You say it is necessary, in order to bring your illuminating power up to 16 candles from your present 14½, to ask 4s. or 4s. 3d. as a start from your 3s. 3d.? Will you tell us what you want to add to that?—I start with the cost, charges, working expenses, and general expenses connected with the business, and the materials, 32·25d. Then there is the cost of the extra two candles, which is 3½d., and 1d. per 1000 feet for the removal of the sulphur. Adding that 4½d. to 3s. 3d. brings it to 3s. 7½d. There is also the additional capital of £45,000 to be expended, and I add 5·16d. for that.

I thought you said you were going to increase 10 per cent.?—Then it will take ten years before the whole is utilized.

Do you mean to say you wish the Maidstone Company to expend capital without a chance or a reasonable probability of having a sufficient remunerative return?—No one wishes capital to be spent unremuneratively, but the capital must be expended before the business can be added to. We cannot set up a little bit of a retort-house; we must build the house.

Do you think it will be fair to saddle the consumers of Maidstone with an initial price calculated for ever, when the Company are to be recouped at any rate within ten years?—I do not provide for ever; but I am obliged, as a practical man, to point out that it will be much fairer for the Company to meet the growing requirements of the place, and spend this £50,000, than to say, "We will go no farther; we have a profitable business, and do not wish to extend it."

With regard to purification, I was glad to hear you tell the Committee it was the want of the exact knowledge of a scientific chemist which made the difference in a provincial town. What money compensation would procure that knowledge?—That I am not prepared to answer, because I do not know how chemists are paid.

You will agree with me that the principal thing to be looked at is not to force the gas too quickly through the lime?—That is why we want large purifiers, so that the current may be slow.

So that it is not an impossibility for a moderately scientific chemist?—If all the surroundings are adjusted to the requirements, of course the difficulty vanishes.

You have been telling us about The Gaslight and Coke Company at Beckton. Is not the expense of purifying there 1d. per 1000 feet?—About that for materials and labour; but there is something more involved, because we have to get rid of the lime, when it is saturated with the sulphur compounds. It has to be carted or barged away, and the nuisance arises as soon as you disturb it, because it flies all over the neighbourhood.

The CHAIRMAN: You would have to get the lime removed, whether the quantity of sulphur allowed in the gas was 20 or 25 grains per 100 feet.

Witness: When it is forced upon us; but there are many places where there is nothing of the sort.

The CHAIRMAN: I am now speaking of what the Bill provides for.

Mr. POPE said the Bill did not mention sulphur. If the Committee thought it right to impose this condition on the Company it would be something in addition to what was provided in the Bill.

The CHAIRMAN said it was referred to in the petition, and he supposed for all practical purposes the difficulty in getting rid of the nuisance would be the same whether the quantity was 20 or 25 grains.

Witness said that if large purifiers were erected, and a margin of 5 grains allowed, the difficulty would be obviated. Gas could be purified at ordinary works without the highly scientific process of lime first and oxide of iron after, by the simple process of passing it through oxide of iron, and then through carbonate of lime, and so taking out the carbonic acid. Then the nuisance would vanish altogether.

By Mr. DUGDALE: Clauses with regard to impurity are inserted in all Acts, but it is not common in provincial Acts to have a strict test with regard to sulphur compounds. Sulphuretted hydrogen and ammonia are prohibited under the General Act.

Mr. POPE said he was authorized by the Gas Company to assent to a provision of 20 grains of sulphur, if the Corporation would agree to accept the London principle of taking an average of three days, so that there might not be an accidental excess to subject them to a penalty.

Mr. DUGDALE said he could not agree to that.

(*To be continued.*)

Legal Intelligence.

HIGH COURT OF JUSTICE, IRELAND.

COMMON PLEAS DIVISION.—SATURDAY, JUNE 26.

(*Before Justice* O'BRIEN *and a Common Jury.*)

NEWRY GAS CONSUMERS COMPANY *v.* THE TOWN COMMISSIONERS OF NEWRY.

This case, which had occupied the Court the two previous days, was now concluded. It was an action brought for the recovery of £147 9s. 10d., the ascertained value of certain materials which it was alleged the defendants undertook to purchase when taking over the Gas Company's undertaking. By an agreement made in pursuance of the provisions of the Newry Commissioners Gas Act of 1878, the Gas Company conveyed their undertaking to the Town Commissioners in consideration of £28,500 paid to them by the defendants, in addition to which it was provided by the 9th section of the Act, that they should pay "for all coal, and other material necessary for the purposes of the undertaking, remaining in stock at the date of transfer, at such price as shall, failing agreement, be determined by arbitration." The defendants purchased the coal; but, as the plaintiffs alleged, refused to take over the other materials in stock, the value of which was ascertained to be £147 9s. 10d. The defendants denied that the articles were materials within the 9th section, alleging that they were included in the purchase price; and made a counter-claim in respect of an alleged breach of the duties imposed on the plaintiffs by the Act, to keep up the usual supply of gas pending the transfer, and to maintain the works in a condition of efficiency. In their counter-claim they specially alleged that when the gas undertaking was transferred to them, the supply of coal had been suffered to run short, and they were obliged to purchase a large quantity of inferior coals in Newry at a loss, in order to keep up the supply of gas to the consumers. The Company, however, traversed this counter-claim; and brought forward evidence to show that the short supply of coal was no fault of theirs.

Justice O'BRIEN, in suggesting that a *stet processus* be entered (the plaintiffs undertaking to pay the costs of the defendants), remarked that there was no doubt an insufficient supply of coal was maintained by the plaintiffs, but he acquitted them of any sinister or underhand design in reference to the matter.

Judgment was entered accordingly.

EDMONTON PETTY SESSIONS.—MONDAY, JULY 5.

(*Before Messrs.* JAMES ABBISS, *Chairman;* H. NASH, J. HOWARD, *and* J. BOLTON DOE.)

THE EXTRAORDINARY CHARGES AGAINST THE DIRECTORS OF A GAS COMPANY.

Mr. *John Malcolm*, one of the Directors of the Tottenham and Edmonton Gaslight and Coke Company, was charged on two summonses obtained at the instance of Mr. W. Bellingham—first, that he did between April 10, 1878, and on divers days between that day and April 10, 1880, then being a Director of the Tottenham Gas Company, unlawfully and with intent to defraud omit, and concur in omitting certain material particulars in a book or books of accounts (to wit), the gas consumers ledger or ledgers belonging to the said Company; and, secondly, that he had taken about 100,000 cubic feet of gas or thereabouts, the property of the Company. The circumstances in this case were somewhat similar to those in the charge against Mr. J. Brickwell, reported in our issue of the 29th ult.

Mr. BESLEY, as before, appeared for the prosecution; and Mr. WEBSTER, Q.C., for the defendant.

Mr. BESLEY, in opening the case, said in the former charge he had pointed out the section of the Act of Parliament which applied to the case; but, in consequence of the able address of his friend Mr. Webster, he thought it desirable to call attention to the meaning of the word "fraud" as stated in "Chambers's Dictionary." "Fraud" was there defined as "an artifice by which another is injured," and this definition had obtained currency in all the Law Courts. The 82nd section of the Act stated that whosoever, being a director, public officer, or manager of any public body, should receive any of the public property otherwise than in payment of a just debt or demand, or omit to make or cause to be made a proper entry in the books of the body corporate, should be held to be guilty of a misdemeanour. The 86th section provided that nothing in the said section should affect or prejudice any agreement entered into or security given by any trustee having for its object the restoration or repayment of any trust property misappropriated. Whether this was applicable to a director of a public company or not was not for him to discuss; but he thought as reference was made to the last preceding section, it was intended to cover every form of breach of trust which was done fraudulently. Now it was necessary to make out that the defendant was a Director or member of the Company, and the inquiries which had been made disclosed these facts: That early in the history of the Company, a Miss Henry was possessed in her own right of 100 original shares, and that after her marriage with Mr. Malcolm she remained upon the register in respect of these shares. Mr. Malcolm was a Director of the Company in 1855, but not being a resident within the district at that time, he did not have a supply of gas from the Company until the 4th of October, 1875. The qualification of a Director by the statute was 100 shares, and Mr. Malcolm held 218. In December, 1869, he transferred 100 shares to his wife; in December, 1873, he transferred 10 shares to another lady; and in February, 1874, he executed a transfer of 100 shares to Alderman Finnis. So that by February, 1874, he had denuded himself of 210 shares, leaving only 8 shares in his name. This number did not qualify him as a Director, though he still continued to act as such. The next point was this: That on the 14th of April, 1874, he, carrying on business with Mr. Henry and Mr. Stewart, under the style of T. and D. Henry and Co., filed a petition in liquidation.

Mr. WEBSTER said it was monstrous to go into these matters. They had nothing to do with the fact of Mr. Malcolm filing a petition in liquidation, but were simply dealing with the allegation that he, being a Director of the Tottenham Gas Company, consumed gas fraudulently.

Mr. BESLEY thought it most material to see in what capacity Mr. Malcolm was at the time of joining the Company.

The CHAIRMAN: I think you are justified in stating what you have, but there is no necessity to go into the question which you are now opening.

Mr. BESLEY said he could show that Mr. Malcolm, under his own hand, swore that he only held 8 shares in April, 1874.

Mr. WEBSTER said there was no charge of perjury in question. There were 100 shares standing in Mr. Malcolm's name; and, consequently, he was qualified to act as a Director of the Company.

Mr. BESLEY said there were elements of immense importance surrounding the case; and it was a matter of public importance to know that there was a declaration upon oath by Mr. Malcolm that he only held 8 shares in the Company. On the 22nd of August, 1874, he received a transfer through a Mr. Brackenbridge of 100 shares from his wife, and this was his qualification for a directorship. On the 26th of August, 1874, Alderman Finnis used the conveyance which had been made to him in the previous February, and, therefore, it became necessary for the defendant to have a transfer from his wife, which he took on the 22nd of August, 1874. In 1875 he came to live within the district supplied by the Company, and having made the usual application, a meter was fixed, and from that date he had consumed 312,000 feet of gas, of the value of £66 16s. 7d. The state of the index of his meter had been recorded by the defendant every quarter, but by his express directions the account had not been entered in the consumers ledger.

Mr. WEBSTER: By whose direction?

Mr. BESLEY: By Mr. Malcolm's express direction. After the discovery at the meeting of the Company on the 10th of April last, the defendant paid by cheque for the amount of gas consumed, but this payment did not invalidate the charge that he had fraudulently offended against an Act of Parliament. He (Mr. Besley) would remind the Bench that the conversation between the Directors, the date of which had been fixed by Mr. Randall, as to not preferring a charge against the Chairman or the Deputy-Chairman of the Company, took place when Mr. Malcolm was present, but that gentleman was not in a position to take gas until 14 years afterwards. After proving the facts which he had shortly opened, he should ask the Bench to commit the defendant for trial.

Mr. *Henry Alfred Stacey*, examined by Mr. BESLEY, said: I produce the file of proceedings in bankruptcy in the matter of David Henry, John

Malcolm, and George Stewart, trading as T. and D. Henry and Co. The petition was presented by the debtors.

Mr. WEBSTER objected to the proceedings in bankruptcy being used in the present case. If necessary, he was willing to give any explanation upon the subject; but they had not met to inquire what the defendant had done on a previous occasion. They were present upon a summons charging the defendant with having fraudulently converted gas to his own use. Mr. Besley was trying to show that some five or six years ago the defendant dealt with his shares, and made some statement in bankruptcy, but there being no charge of this nature before the Bench, it could not be gone into.

Mr. BESLEY said it was important to know whether the defendant was a duly qualified Director, or was acting as a member, or a mere Shareholder in the Company. He only proposed to show that in the liquidation proceedings Mr. Malcolm stated he only held 8 shares.

The CHAIRMAN: What bearing would that have upon the charge now made against him?

Mr. BESLEY said the way he put it was this: That the evidence must go before the jury, to show the fraudulent intent.

Mr. HOWARD said the words of the Act were "director or member;" therefore it did not much matter whether he was a Director or not.

Mr. BESLEY said if the evidence was excluded, the Court were prevented from seeing whether he improperly took fees as a Director.

Mr. WEBSTER said the gas was not taken until 1875, and, according to his friend's opening, Mr. Malcolm purchased from Mr. Brackenbridge, in 1874, 100 shares.

The CHAIRMAN having allowed the objection, the witness, upon the request of Mr. Besley, was bound over.

Mr. *James Randall*, examined by Mr. BESLEY, said: I am the Secretary of the Tottenham and Edmonton Gaslight and Coke Company. Mr. John Malcolm was appointed a Director of the Company on the 1st of September, 1855, and he has acted as a Director from that date till the present. He came to live within the district supplied by the Company about October, 1875, and occupied Elgin Villa, Landsdown Road, Coleraine Park. Upon the request of Mr. Malcolm, dated Oct. 1, 1875, a meter was fixed at the house, and the state of the meter was taken every quarter by the inspector, Mr. Caine, or his assistant. The inspectors were supplied with a meter-book, which was made up of two parts, the foil and counterfoil, the state of the index of the meters was entered upon both, and one part was left with the consumers. I produce the meter-book, having the counterfoil in it on which Mr. Malcolm's name appears, for the Christmas quarter of 1875. He is there charged with £3 13s. 10d. for gas and 2s. 6d. meter-rent.

Mr. BESLEY: Had you any conversation with Mr. Malcolm, and, if so, when, about the supply of gas?

Witness: About the 18th of December, 1875, he said, "You will be taking the register of the meters shortly, will you not?" I said, "Yes, Sir." He said, "I suppose you will not charge me with the gas I have consumed," and that as Mr. Brickwell had a free supply he presumed it was the privilege of resident Directors to have a free supply.

Examination continued: I made no further remark, and the subject dropped. My impression was that there had been a previous conversation between Mr. Malcolm and the Directors about it. In consequence of the conversation I wrote the word "open" on the counterfoil of the Christmas account, 1875, as an instruction to the clerks not to enter it in the consumers ledger. I also told the clerks to omit the account from the ledger. The conversation to which I have referred occurred between myself and Mr. Malcolm just before the finance meeting, while waiting for Mr. Gripper, one of the Directors. I produce the meter-books for the following 17 quarters, and from each the counterfoil has been torn.

Mr. WEBSTER: The books show that the state of the meter was regularly taken every quarter; that is all.

Mr. BESLEY: And that the other part was handed to the consumer. (To witness:) Upon each of the counterfoils in these 17 books are the words "not to be entered" written?

Mr. WEBSTER objected to the question on the ground that the defendant was not responsible for what some one else had written.

Mr. BESLEY said the Act provided that if a person caused an entry to be omitted he was responsible for so doing.

Mr. WEBSTER submitted that if the entries were going to be used against the defendant, they must be shown to have been made with his knowledge.

The MAGISTRATES CLERK: It may be stated that they were so entered, and he may be asked how they came to be so entered.

Mr. BESLEY: Across the counterfoils are the words "not to be entered" written?

Witness: Yes, and initialled by me.

Examination continued: Every fortnight the arrears of consumers are brought before the attention of the Directors, and the outstanding accounts book would also be brought before them upon the first Saturday in the third month after each quarter. There is no resolution of the Directors that Mr. Malcolm was not to be charged. I have searched the minute-book of the Board of Directors to see if there is any record of the subject of the free supply of gas to the Directors, but I cannot find any. Between Nov. 11, 1875, and February, 1879, we have a ledger account against Mr. Malcolm for coals supplied. We sell coal to Directors at the net cost, but we have 1s. a ton for screening, and 2s. for carting. We get no profit.

Mr. WEBSTER said the whole of the coal had been paid for.

Mr. BESLEY: Was the subject of the supply of gas mentioned between you and Mr. Malcolm on any other occasion besides the one that you have spoken of?

Witness: No, not until he asked for his account after the 10th of April this year. The account was paid on the 24th of April. The amount was £66 16s. 7d. for 312,000 cubic feet of gas.

[A copy of the account was put in and marked.]

The CHAIRMAN: When did Mr. Malcolm ask for his account?

Witness: At the meeting of Directors after the 10th of April. He said he thought the impression of the meeting was that he should pay for his gas, and he asked for his account.

Mr. BESLEY: It appears by the share register that on the 4th of November, 1868, Mr. Malcolm held 218 shares, and on the 2nd of December, 1869, he transferred 100 to Jane Malcolm——

Mr. WEBSTER said the Bench had already ruled that this point was not material. The book, if put in, would speak for itself.

Mr. HOWARD said defendant was responsible for his acts as a Director, even if he was not qualified.

Mr. WEBSTER said that was so.

Mr. BESLEY agreed that he would be, as a Director *de facto*, though not *de jure*. Continuing, he said: In December, 1873, 10 shares were transferred to Miss Terry, and the 100 shares formerly held by defendant's wife were transferred to him from Mr. Brackenbridge on Aug. 22, 1874, Alderman Finnis having registered the conveyance for 100 shares from the defendant on Aug. 26, 1874.

Mr. HOWARD said he might be quite wrong, but he did not see how the case depended upon all this.

Mr. BESLEY said his contention was that directly a liquidation occurred every shred of property passed to the trustee, and there could be no qualification by taking shares from his wife; the shares must be held in his own right.

Mr. WEBSTER protested against statements being made without the shadow of evidence in support, and denied that the defendant had taken shares from his wife in the sense imputed by Mr. Besley.

Mr. BESLEY said he had it on oath that the 100 shares which went to the defendant from Mr. Brackenbridge originally belonged to Jane Malcolm. On Feb. 20, 1879, 35 shares were transferred to the defendant.

Cross-examined by Mr. WEBSTER: We supply coke and other residuals to a number of persons. Mr. Malcolm bought coke as well as coal, but he has paid cash for all supplied to him.

[With a view to shorten the inquiry, it was here arranged between Counsel that the depositions in the other case, as to the interview at Messrs. Munns and Longden's, the letter asking the defendants to retire, &c., should be treated as part of the present case.]

Cross-examination continued: At the conversation in December, 1875, when Mr. Malcolm spoke to me about the Directors having the privilege of a free supply of gas, I think he used the words for "private use." Rightly or wrongly, I acquiesced in what he said.

By the CHAIRMAN: In consequence of this conversation I wrote across the book "not to be entered." I assumed there had been a prior conversation between Mr. Malcolm and the Directors. From that date to the present no Director, except Mr. Malcolm, ever mentioned the fact that Mr. Malcolm was to have gas without charge.

Cross-examination continued: After the conversation Mr. Malcolm never interfered directly or indirectly in any way with the manner in which the entries in the books were made. The books never came under his notice. In consequence of my entry the amount due for gas has never appeared in the schedule of arrears. I was present at the meeting on the 10th of April last, and I heard Mr. Bellingham say, "Perhaps Mr. Malcolm will give the same explanation." Mr. Malcolm said: "I have been Deputy-Chairman for two years. The meter has been regularly taken every quarter, but no account has been sent in to me; still, if the indication of the meeting is that I should pay for it I am ready to do so. I believe it was placed to my credit on the footing that the Chairman and Deputy-Chairman should not be charged for gas consumed in private houses, but in any case there is a meter, and I am ready to pay for the gas I have used."

Re-examined by Mr. BESLEY: Mr. Gripper has always paid for the gas consumed in his private house. Mr. Malcolm was appointed Deputy-Chairman in Nov., 1876. The statement as to a free supply for two years was inaccurate. When I heard the Chairman and Deputy-Chairman making statements about a free supply, I did not remind Mr. Brickwell that Mr. Malcolm had had a free supply for four years; so many people were speaking at once. When Mr. Malcolm spoke to me about resident Directors having a free supply, I was aware that Mr. Gripper, who was a resident Director, paid for the gas he used, but it did not occur to me to mention it.

Mr. *Charles Philip Caine*, Chief Inspector of the Company, proved that the state of the meter in defendant's house was taken each quarter, and that a paper showing the quantity consumed was left at the house.

[It was then agreed that the evidence given by the Auditors in the previous case should be considered as given in this.]

Mr. BESLEY: That is the case.

Mr. WEBSTER said he sincerely wished it had fallen to the lot of some one else to address the Bench in the present case; but, appearing for Mr. Malcolm, it was his duty to make a few observations on his behalf. Although he was aware the Bench had had a similar case very recently before them, he was sure he should be listened to, while submitting that Mr. Malcolm ought not to be committed for trial; and, to a certain extent, he was encouraged by what fell from the Bench in the previous case—viz., that they were not free from doubt on the subject. He ventured to point out that if they had any doubt, in the ordinary sense of the word, their duty was to leave the prosecutors to prefer an indictment, and not to commit the defendant for trial upon unsatisfactory evidence. Then they were told that they should put a construction upon the word "fraud" which, he ventured to think, no magistrate, or lawyer, or any body accustomed to deal with such questions, would think of suggesting was the construction to be put upon it. His friend had read from "Chambers's Dictionary," but the definition of the word there given was one not recognized by the law of England. Fraud was there stated to be "an artifice by which another is injured;" but, in justice to his client, the whole of the definition ought to have been read, when it would have appeared that "an artifice by which another is injured" was not a correct definition of the word "fraud." He would read the whole definition:—"Fraud: an artifice by which another is injured; deceit, trick, imposture, stratagem." As a whole, there was not much wrong about it. As to the meaning of the word "fraud" or "fraudulent," Lord Justice Brett, who was no mean authority, had laid it down that there must be a criminal mind, and that a *bonâ fide* mistake did not constitute fraud. Just consider the evidence upon which these vindictive gentlemen asked that Mr. Malcolm might be sent to trial. Mr. Malcolm applied in the ordinary way for gas; there was not the slightest concealment about it; there was the entry of his application in the book; the meter was put up; and the officials took the state of the index quarter by quarter. It was perfectly clear that so far from Mr. Malcolm ever having moved hand or foot to prevent the fact of the supply of gas to him being known, he knew perfectly well that the officials of the Company were aware of the fact of gas being supplied, and from first to last everything was done in the most open and straightforward manner. Now what happened? He saw Mr. Randall, and said, "I suppose you will not charge me for gas. I suppose it is the privilege of Directors resident in the district to have a free supply to their private houses." Now, in order to constitute an offence there must be evidence that when Mr. Malcolm made that statement, it was a fraudulent and untrue statement. If he was telling the truth, no offence could be committed, there being no evil mind at the time. According to Mr. Randall's evidence, the conversation took place in 1875, but there had never been the slightest communication, verbal or in writing, from that time to the present by Mr. Malcolm, and the entries had been made by the Secretary, under the impression that he was acting perfectly rightly. Mr. Malcolm had never interfered directly or indirectly in the matter, and, therefore, he (Mr. Webster) submitted that there was no evidence in support of either charge. His friend said it was a matter of immense public importance that the thing should be cleared up, and he sought to prejudice the mind of the Bench, by making suggestions against the conduct of Mr. Malcolm years ago with reference to shares and bankruptcy proceedings, for the purpose of satisfying the wish of his own clients; although he had the register of Shareholders before him, showing that Mr. Malcolm was qualified to act as a Director, he being the duly registered holder of sufficient shares. At the meeting of the Company on the 10th of April last, Mr. Malcolm stated that he was perfectly willing to pay for the gas if the meeting should so decide. There could thus be no concealment about the matter, and yet Mr. Besley said that payment could not possibly purge the offence. He

surely had forgotten that the summons was not taken out until months after the thing was discovered and the account paid. Unless they could evolve out of their own consciousness some evidence that the man had a guilty mind at the time of the conversation with the Secretary, it was impossible to say there had been a taking or appropriation of the property with intent to defraud. He hoped the Magistrates would not allow the Criminal Law to be used as an engine to extort from gentlemen a confession that they had acted improperly, and that they would say there was not any evidence of a criminal mind or guilty attempt.

Upon the conclusion of Mr. Webster's address, the Magistrates retired, and returning into Court after an absence of twenty minutes,

The CHAIRMAN said: The Bench are unanimously of opinion that the case must be remitted to a jury for trial, and in arriving at this decision they have nothing to do with the motives which may be brought forward or asserted on the part of the prosecution.

Mr. Brickwell and Mr. Malcolm were then committed for trial, but released upon their own recognizances.

LAMBETH POLICE COURT.—SATURDAY, JULY 3.
(*Before Mr.* ELLISON.)

OPPONENTS OF THE CONSTANT SUPPLY SYSTEM.

In the JOURNAL of the 29th ult. it was reported that summonses had been taken out by the Lambeth Water-Works Company against *Matilda Flight* and *Luther Clements*, two owners of property situated respectively in Hope Street, Villa Street, Walworth, and Gurney Street, New Kent Road, for neglecting to comply with the regulations under the Company's Acts to provide stand-pipes or covered cisterns with proper fittings, in place of butts, in houses belonging to them. The cases came before the Court on the 12th ult., and were adjourned, as it was stated that Mrs. Flight had commenced the work; and although an order to pay a fine, together with costs, was made upon the other defendant, an adjournment was allowed to see if the work was carried out.

Mr. BESLEY attended to-day on behalf of the Water Company, and stated that, with regard to Mrs. Flight, she had carried out the requirements of the Company, and therefore the summons against her would be withdrawn, upon the payment of costs. With regard to the defendant Clements, a letter had been received in which it was stated that the property had been sold.

Mr. ELLISON said he should still uphold the order he had made against the defendant (who did not appear), that he pay a fine of 5s. and £3 5s. costs.

Mr. BESLEY asked for a term of imprisonment to be fixed in default.

Mr. ELLISON said it would be 14 days.

Miscellaneous News.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

The Nineteenth Annual General Meeting of this Association was held last Thursday and Friday, in the Academy Hall, North Inch, Perth; and pending the preparation of the full report of the proceedings, we may lay before our readers a brief account of what was done.

The Association steadily advances in numbers, four ordinary and three extra-ordinary members being elected—viz., Messrs. Blyth (Kettle), Carmichael (Kirriemuir), Marshall (Brechin), and Wilson (Stonehouse), as ordinary members; and Messrs. Bray (Leeds), Briggs (Arbroath), and Donald (Johnston), as extra-ordinary members.

The President for the year was Mr. J. Robb, of Haddington, and his opening address, though short, dealt with several points of great interest to gas managers. His remarks were listened to with marked attention; and at their close, on the motion of Mr. D. Bruce Peebles, a vote of thanks was accorded to him.

Mr. Peebles, the Auditor, then read his report on the financial position of the Association; the balance at the bank being given as £27, while there stood to the credit of the Chemical Research and Patents Investigation Fund only £16 15s. 6d.—a sum which we trust will be very largely increased, or little can be done to carry out the object of its institution.

The Scrutineers (Messrs. Donaldson and Hall, jun.) subsequently reported that the following gentlemen had been elected office-bearers of the Association for the coming year:—

President.—Mr. James M'Gilchrist, Dumbarton.
Vice-Presidents.—Mr. J. Mackenzie, Dunfermline;
Mr. T. Whimster, Perth.
Secretary and Treasurer.—Mr. D. Terrace, Arbroath.
Committee (to replace those retiring).—Mr. G. R. Hislop, Paisley;
Mr. A. Mitchell, Dundee; Mr. S. Stewart, Greenock.
Auditor.—Mr. D. Bruce Peebles.

It was agreed that the place of meeting next year should be in Glasgow.

The first paper read was one by Mr. J. Anderson, jun., of Leven, on "Mechanical Scrubbers"—specially introducing to notice Anderson's Brush Scrubber, and Kirkham, Hulett, and Chandler's "Standard" Washer Scrubber. The paper provoked a lively discussion, in the course of which mention was made of a scrubber designed by Mr. W. Young, of the Clippen's Oil-Works, Paisley, more particularly for use in small gas-works. This we shall illustrate when giving the paper Mr. Young afterwards presented to the meeting.

Dr. Miller, of the Perth Academy, then delivered a lecture on "Heat: Its Mechanical Energy;" after which the adjournment for lunch took place, and a visit was, by invitation of Mr. Whimster, paid to the Perth Gas-Works, to inspect one of Anderson's Brush Scrubbers which had been temporarily erected for exhibition in connection with the paper noticed above. Attention was also given to a small "Bisschop" gas-engine, which which had likewise been sent merely to show its action. The members further had an opportunity of seeing a pipe-joint made with Spence's metallic compound, which formed the subject of the first paper read on the re-assembling for the afternoon sitting.

In this paper Mr. Whimster expressed his entire satisfaction with the compound, and stated that he had recently completed the laying of a length of main with it in Perth, from the jointing of which he anticipated the best results. He referred to the paper read by Dr. Cole at a recent meeting of the Society of Arts, and reproduced in the JOURNAL, and laid stress on the fact therein recorded of the success attending some experiments carried out with the metal at the South Metropolitan Gas-Works. He did not, however, allude to the letters subsequently published in our pages, to the effect that anything but sound joints were obtained with it at the London Gas Company's works and the Windsor Street Gas-Works of the Birmingham Corporation; nor to the assertion, which was never contradicted, that the identical compound was known and used many years before the date of Spence's patent.

Mr. J. M'Gilchrist's paper on "Retorts and Retort Settings" was a good, practical, and discussable one, and occupied the attention of the meeting till it was necessary to take up that by Mr. W. Young, entitled "Jottings on the Principles involved in Gas Manufacture," which was well received, as are all Mr. Young's efforts at enlightening his fellow-members.

At five o'clock dinner was served at the Royal George Hotel, the President occupying the chair, supported by Dr. Miller, Mr. Terrace, and Mr. Mackenzie; while the vice-chairs were filled by Mr. Whimster and Mr. M'Gilchrist. After dinner and the usual loyal toasts had been disposed of, the Chairman proposed "The Army, Navy, and Volunteer Forces," which was responded to by Mr. D. B. Esplin, of Forfar. The toast of "The North British Association of Gas Managers" was replied to by Mr. M'Gilchrist; that of "The Fair City of Perth," by Dr. Miller; and that of "Kindred Associations," by Mr. Donaldson and Mr. Peebles, as well as by Mr. D. M. Nelson, of Glasgow, on behalf of the North of England Association. Other toasts followed, interspersed with songs which made the evening pass most pleasantly.

On Friday morning the discussion, adjourned from the previous afternoon, on the subject of retort-settings, was resumed and concluded, after which the remainder of the papers were read in the following order:—"Gas Purification by Means of Oxide of Iron," by Mr. D. M. Nelson; "Notes of the Cost of Working a Gas-Engine, Compared with the Same Work done by Steam Power," by Mr. F. T. Linton, of Leith (read by the Secretary); and "A Few Little Things worth Knowing to a Gas Manager," by Mr. Whimster; after which Mr. M'Gilchrist explained a new dial he had had arranged for a photometer meter.

This closed the proceedings; and, after an adjournment for lunch, a considerable number of the members started off for a two hours drive—a welcome relaxation after the business of the meeting.

METROPOLIS WATER SUPPLY.

The following are the returns of the Society of Medical Officers of Health on the Composition and Quality of the Metropolitan Waters in June, 1880:—

NAMES OF WATER COMPANIES.	Total Solid Matter per Gallon.	Oxygen required by Organic Matter, &c.	Nitrogen — As Nitrates, &c.	Ammonia.		Hardness (Clark's Scale).	
				Saline.	Organic.	Before Boiling.	After Boiling.
Thames Water Companies.	Grs.	Grs.	Grs.	Grs.	Grs.	Degs.	Degs.
Grand Junction	19·28	0·043	0·142	0·000	0·008	14·3	3·3
West Middlesex	19·54	0·043	0·142	0·000	0·006	14·0	3·3
Southwark and Vauxhall	18·44	0·054	0·142	0·000	0·010	14·0	3·0
Chelsea	18·62	0·035	0·131	0·000	0·008	14·3	3·0
Lambeth	20·13	0·024	0·142	0·000	0·010	14·3	3·0
Other Companies.							
Kent	31·67	0·004	0·403	0·000	0·004	20·3	5·6
New River	20·31	0·012	0·142	0·000	0·007	14·3	3·0
East London	20·34	0·051	0·131	0·001	0·008	14·8	3·3

Note.—The amount of oxygen required to oxidize the organic matter, nitrites, &c., is determined by a standard solution of permanganate of potash acting for three hours.

The water was found to be clear and nearly colourless in all cases.

C. MEYMOTT TIDY, M.B., &c.

SALE OF SHARES IN THE NEW RIVER COMPANY.

On Wednesday last a large number of speculators and others interested in the purchase of water companies shares attended at the Auction Mart, Tokenhouse Yard, E.C., it having been announced that Messrs. Edwin Fox and Bousfield were about to offer for sale by auction one-tenth of a King's Moiety in the New River Company, and five £100 new shares in the same undertaking.

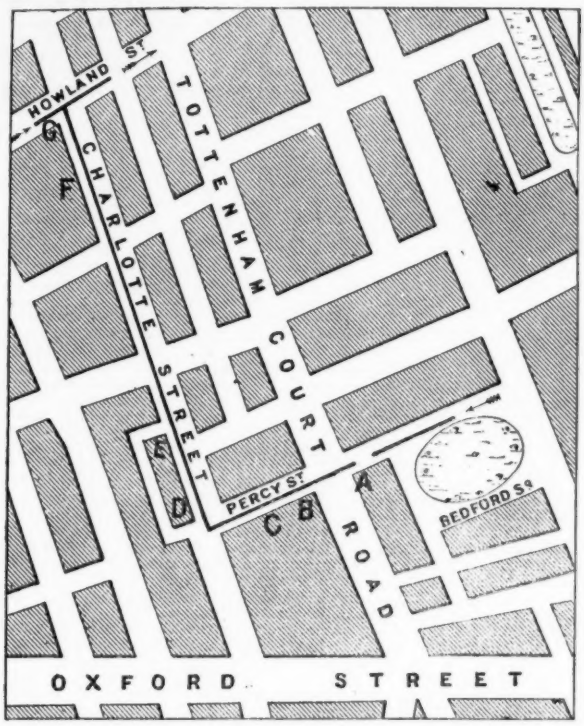
In offering the property to public competition, the Auctioneer, Mr. E. H. BOUSFIELD, said that the special character of the New River Company's shares was now so well known that it needed no words from him to recommend them as perfectly safe investments. The increase in the revenue of the Company had, he said, steadily advanced the income, having more than doubled itself in the past 16 years. It was £206,822 in the year 1862, and £424,097 last year. During the excitement caused by the impression on the public mind that the Metropolitan water undertakings would be acquired by the Government, considerable speculation took place in the Companies shares. Those of the New River Company, however, had never given rise to speculation, but had always remained firm in the position they had acquired, and invariably realized good prices. He then referred to the evidence given by Mr. E. J. Smith before the Select Committee on the London Water Supply, and said he (Mr. Bousfield) was of opinion that the New River Company would probably be taken over by the Government, in which case they would have to pay a high compensation, which would increase the value of the Company's shares; but it would be better still for the Proprietors if the Company were left alone, since the amount of increase in the value of their property in the next few years would be difficult to imagine. The present system of charging for water according to the rateable value of the property to which it was supplied should, he thought, certainly continue, as any alteration that would lead to economizing water in poor districts would be injurious in many ways, and would greatly affect public health. The notion of bringing water 200 miles for the purpose of competing with the existing Companies was, to his mind, impracticable, and with regard to the New River Company, it had the exclusive right of supplying its own district and, therefore, no fears of the future need be entertained on this account. Then the New River Company had, in addition to its water business, extensive and important estates throughout London and the counties of Middlesex and Hertford, extending over hundreds of acres, and capable of producing large revenues in the future. Part of this property, called the Myddelton Square Estate, and comprising 50 acres of ground, covered with buildings, in the heart of London, was, he said, now let on ground-rents, and in about 27 years the leases would begin to fall in, and the rack-rentals would thus become an additional source of income to the Company. Therefore, should the water business of the New River Company ever be taken over by the Crown, the Company would still be left in possession of its valuable freehold estates.

Mr. Bousfield then requested offers for lot 1, the one-hundredth part of a share in the King's Moiety of the estates of the New River, entitling the purchaser to a vote for the counties of Middlesex and Hertford, as well as to the proportion of dividend, which was at the rate of £23 16s. per annum at Christmas last. There was a brisk competition, and this and the two following lots were sold for £910 each. The next three lots, each of a similar character, brought £920 each. The three following lots went for £915 each, and the last lot sold for £925. The total amount realized for the tenth of the moiety was £9160, which would make the entire share worth something like £92,000. The five new shares, which have the same privileges as the old shares (with the exception of the parliamentary franchise), were then disposed of at the following prices:—One at £885, and four at £380 each; the total amount realized being £1905.

KIMBERLEY WATER-WORKS COMPANY, LIMITED.—This Company was registered on the 3rd inst. with a capital of £350,000, in 35,000 shares of £10 each. The object is the construction of water-works in the South African colonies.

ALARMING EXPLOSION OF GAS IN THE METROPOLIS.

On the evening of Monday, the 5th inst., there occurred in the western district of the Metropolis an explosion of gas of an alarming and totally unprecedented character in the history of gas illumination. The catastrophe was attended with considerable destruction of property and much personal injury, which has unhappily resulted in loss of life. The portion of the Metropolis affected was that lying to the west of Tottenham Court Road, an important thoroughfare running from Oxford Street to the Euston Road, and the two streets in which the bulk of the damage to property was caused run respectively at right angles with, and parallel to the above-named thoroughfare. The positions of the streets are roughly shown on the accompanying map.



The whole of the locality which suffered by the explosion lies in what might be called the western central district of The Gaslight and Coke Company, and is supplied with gas by the old small-sized mains of 4 and 6 inches diameter originally laid down. For some time past, however, the service has been regarded as altogether inadequate to the requirements of this important part of the Metropolis, and therefore it was determined to lay a 36-inch trunk main from the 48-inch main in the Goswell Road—the main which conveys the gas from Beckton to London—westward to a point a little to the south of the Euston Road. Here it was to join the main coming from Fulham in a north-easterly direction to King's Cross, where the works taken over by the Chartered Company on their amalgamation with the Imperial Company are situated. This latter main runs along a street called Howland Street, at right angles with Tottenham Court Road, and so on eastward. The work of laying the main was entrusted to Messrs. John Aird and Sons, whose experience in such matters is, perhaps, unequalled; and the supervision of the entire work was left with the Company's Chief Inspector, Mr. T. C. Hersey, about whose qualification for the duty not a single doubt can possibly exist; and he was supported in his labour by all the usual qualified subordinates—men to whom main-laying is, so to speak, an every-day occurrence. The work was commenced in February last in the Goswell Road, and the operations were continued uninterruptedly westward to the end of Bayley Street—a short street leading from Tottenham Court Road eastward into Bedford Square, and marked A on the map—where the open end of the main was, on the morning of the accident, exposed to view in the trench. So far all was ready with respect to what may be called the east main—the portion of the new main running from east to west. In the meantime a connection with the Fulham main had been made at Howland Street, at the point marked G on the accompanying map, and the work had been continued southwards down Charlotte Street, eastwards along Percy Street, and so across Tottenham Court Road to Bayley Street, where the end of the west main—the portion of the new main running from west to east—was also to be seen in the trench. The end of this main, however, was plugged, and had upon it a ¾-inch stand-pipe. It may here be said that the connections at Goswell Road and at Howland Street had the usual valves, and when left were tested and found to be perfectly sound.

This is how matters stood on the morning of Monday, the 5th inst. As far as was known, all was ready east and west, and there was only a single piece of main to be laid in the trench at Bayley Street to make the entire length of piping from Goswell Street to Howland Street—a distance of about two miles—complete. This connection was to have been made on Tuesday, the 6th inst., and accordingly, on the evening of the previous day workmen were engaged in cutting out the plug from the end of the west pipe. The foreman was standing on the main near the stand-pipe, from which he had removed the pressure-gauge with which he had tested the main, and ascertained that there was no pressure in it. He then smelt the stand-pipe to ascertain whether any gas was issuing therefrom, and finding none came out, he applied a light, and almost immediately a dull rumbling sound was heard, followed by an explosion, which blew one of the workmen a considerable distance into the open pipe on the opposite side of the trench, killing him instantly, and so injuring the other man that he died shortly after his removal to the hospital. The foreman escaped unhurt. There was a quantity of dust and smoke, but no flame was seen. Almost simultaneously with this explosion another occurred at the corner of Percy Street, at the point marked B on the map; others following in rapid succession at the several places indicated by the other letters; the final explosion taking place at the junction with the Fulham main at Howland Street.

It is needless to say that, with such an accident as this, the greatest excitement and consternation were caused in the neighbourhood, paving-stones being hurled into the air, to the great destruction of surrounding property and the peril and injury of passers-by. Fortunately the busy thoroughfare of Tottenham Court Road escaped, or the consequences would have been appalling.

Although the first explosion, which occurred at the point A, was of so lamentable a character, little or no damage was done to the surrounding property. The Manager of the Bedford Head Hotel was standing at the door of his house, not more than 20 feet from the spot, when the explosion occurred, and he describes it as a great noise, almost stunning him, and sending him staggering back, though without injuring him. The air appeared filled with what he describes as "a shower of rust," that quite obscured the atmosphere for a moment or two, but he did not see any flame. The first spot at which the roadway was thrown up was at the corner of Percy Street, at the point marked B. Here the main ran along the south side of the street, and the opening in the roadway extends for a length equal to five or six houses. At this point something like a dozen lengths of main must have been upheaved, but there was comparatively little outward damage to the neighbouring houses. Opposite Nos. 6 and 7 in the same street, however, at the point marked C, apparently only a single length of main was blown out; but here the aspect of the houses could only be likened to that which would follow a bombardment. At No. 6 all the windows were broken, even to those in the attic, and very considerable damage was done to the interior, the kitchen and basement being laid open to the street. No. 7, too, was very much shattered, the roof having been broken through by the falling stones. It is fortunate, however, that, considering the great force of the shock at this point, little or no personal injury appears to have been suffered by the occupants. This cannot be said in reference to the next explosion, which occurred at the corner of Charlotte Street, at the point marked D on the map. Here, again, only one length of main seems to have been blown out, yet the destruction of property was very great, and severe personal injury was sustained. The house at the south-west corner of Charlotte Street was shaken, though the outward signs of damage are not strikingly apparent. The next house, however, was greatly injured, the front of the shop being quite destroyed, while the pavement in front, together with the iron railings, were thrown about in the greatest confusion. Here, one of the most serious accidents occurred, two persons—a nephew of the owner of the shop and a servant—being hurled by the recoil of the explosion into the street, and much hurt thereby. Both sustained injuries of exactly similar character—namely, compound fracture of the right leg, and severe scalp and face wounds. In addition, the male sufferer had a simple fracture of the right arm. Next door is the Royal Standard Permanent Benefit Building Society, whose offices were much shattered. The complete destruction of the thick plate glass front gives evidence of the violent shock the premises sustained, which overthrew the iron railings and stonework as well. The roadway at this point was thrown up more violently, perhaps, than at any other spot, though for a shorter distance. Farther on in Charlotte Street, at the point marked E, at the corner of a narrow turning called Bennett Street, the effects of the fifth explosion are seen. Here the opening in the ground is wide and deep, and probably six lengths of main were blown up by the force of the shock, which so shook the foundation of the house at the corner as to necessitate its being propped up. A long tract of roadway intervenes before the site of the sixth explosion is reached—the point marked F on the map. This is in front of Nos. 103 and 105, Charlotte Street, the main running along the west side of the street. At the former house the front wall below the pavement was blown away, and until the wall was shored up the house stood in imminent peril. Fortunately most of the occupants were away at the time of the explosion, which appears to have destroyed about three lengths of main. Passing on northwards, Howland Street is reached. Here there is a great hole, with the broken valve and main-pipe laid bare, and the fragments of jagged iron, which had been driven along the main by the force of the explosion, were here taken out. An immense hole in the trunk main, at the back of the broken valve, testifies to the force of the explosion at this distant point, where fortunately all danger of further destruction ended.

Of course with the great disturbance of roadway caused by this unexampled series of explosions, the mains used for the supply of the district with both gas and water were damaged, the house connections severed, and the sewers broken into. The immediate neighbourhood was in either total or partial darkness on the night of the explosion; but owing to the prompt measures taken by the contractors, Messrs. Aird, and by the Gas Company's Chief Inspector, Mr. T. C. Hersey, temporary connections were effected with the gas-mains, and the supply restored; while the servants of the West Middlesex Water Company worked with commendable alacrity in order that the inhabitants of the district might receive their usual quantity of water.

Considering the extent of ground covered by this unexampled catastrophe, and the time of its occurrence, it is almost surprising that the personal injuries sustained by pedestrians and others, serious though they have unquestionably been, were not still more lamentable. The man Beavis, when extricated from the main, was quite dead, and his death was probably instantaneous. He was at once conveyed to the Middlesex Hospital, and even the cursory examination of the body then made by the House Surgeon was sufficient to show that the injuries comprised a comminuted fracture of the left arm, and simple fracture of the left thigh and of both bones of the left leg. The face was charred and contused, thus being rendered almost unrecognizable, and there were indications of the skull having been fractured. The other man, Burr, was removed from the trench and carried to the hospital in a state of unconsciousness and collapse, the result of the severe injuries he had sustained, which consisted of compound fracture of the right thigh and both bones of the right leg, scalp wounds, contusions, and burning of the whole of the face and of the thigh from the knee-joint up to the abdomen. The injury to the leg was of so serious a nature that amputation was considered necessary, and the poor fellow succumbed soon after the operation. The other serious injuries were those sustained by a servant at the house No. 3, Charlotte Street, and by a nephew of the landlady, the former of whom when admitted into the hospital was, it is stated, found to have a compound fracture of left ankle-joint, severe scalp injuries, fracture of two small bones of left hand, and scald on right arm and hand; while the latter was suffering from the effects of the shock, compound fracture of right tibia, and fracture of right forearm. These are fortunately the only really serious cases. The other injured persons, of whom there were about 25 altogether injured by the explosion, were promptly attended to at the Middlesex Hospital by the senior House Surgeon, Mr. H. A. Smith, and his assistants, who were unremitting in their anxiety to relieve the sufferers, and in most cases they have now been able to return to their homes. Six are, however, still under medical treatment; but happily are all progressing favourably towards recovery. Those who altogether escaped injury—and there were many extraordinary instances of very narrow escapes—have much cause to congratulate themselves.

The varied effects of the explosions will not fail to attract the attention of even an average observer. For example, the Bedford Head Hotel—a fine tavern of essentially the modern class of building, with large plate-glass windows and exterior lamps, which hung almost over the trench in Bayley

Street, is absolutely untouched; while on the opposite side of the street, at a greater distance from the trench, the window of the Bedford Laboratory has been cracked. At other points along the line of the explosion there are similar peculiarities.

It is scarcely necessary to say that the locality has been visited by large numbers of people; but owing to the excellent police arrangements, both on the night of the accident and since, and to the promptitude with which the breaches in the roadway were enclosed by means of barriers, and the damaged buildings shored up, no further disaster or serious breach of the peace has to be recorded.

As soon as possible after the accident gangs of labourers were upon the spot, both from Messrs. Aird and the Gas Company, and they all worked in splendid style during the night and throughout Tuesday. In the night everything had to be done in the darkness, as, of course, it would have been dangerous to have had any light upon the scene until the gas was thoroughly exhausted. The broken mains at Howland Street were speedily plugged with air bags, and the flow of gas was diverted by opening a valve and supplying the district from King's Cross. The result of the efforts made by the workmen was that by Tuesday evening the broken service-mains along the line of the explosion had been sufficiently restored to allow the gas to be lighted as usual. Most of the principal officials of The Gaslight and Coke Company were on the spot in the course of the day following the accident, and the Engineers of the other Companies in the Metropolis tendered their services. Instructions were given that every assistance was to be afforded to those who were injured or rendered homeless by the calamity.

Of course no end of conjectures have been formed as to the cause of the explosion. That there was an admixture of gas and atmospheric air in what was with perfectly good reason supposed to be a dead main, there cannot be a doubt; but in what way this mixture was produced it is useless at present to speculate. It is thought that the passage of some heavily laden vehicle over the valve at Howland Street may have loosened it sufficiently to allow of an escape into the new main of enough gas to form an explosive mixture in different parts of its length, and in the intervening parts a larger proportion which rendered those portions fiery, but not explosive, serving therefore as links connecting the other portions which were fired and exploded in rapid succession. On the other hand, it is asserted that there has for some few weeks past been a constant smell of gas in Percy Street, and it is conjectured that an escape had been going on, and that the escaping gas had somehow or other made its way into the new main. However, conjecture of any kind is useless. The matter is engaging the attention of those most conversant with the subject, and there is little doubt that both in the course of the inquiry into the cause of the death of the two men who were the first to feel the effects of the catastrophe, and in any other official investigation that may be undertaken, the matter will be thoroughly dealt with. The Gas Company and the Contractors are equally anxious that the fullest light should be thrown on what may be regarded as almost an unexampled calamity in gas engineering.

The Inquest.

The inquest on the bodies of Albert William Beavis and William Burr, the two men who met with their death under the circumstances above recorded, was opened on Thursday last, at the Spread Eagle Tavern, Mortimer Street, W.C., by Dr. Hardwicke, the Coroner for the Central Division of Middlesex.

Mr. Besley appeared on behalf of The Gaslight and Coke Company; Mr. R. E. Webster, Q.C., for Messrs. John Aird and Sons, the contractors for laying the main; and Mr. R. Willis, Mr. T. Sampson, and Mr. F. G. Gorton, solicitors, represented various injured persons and owners of damaged property.

Mr. Webster, addressing the Coroner, said: I appear for Messrs. John Aird and Sons, the contractors who were executing the main-laying work for The Gaslight and Coke Company at the time the explosion occurred, and I am desired to say they are most anxious that every possible information should be afforded to the jury. They think it important that the jury should inspect the open pipes in Bayley Street, and at least one other place. Whatever may have been the cause of the explosion—an explosion unprecedented in the history of gas lighting—they deeply regret the loss that has happened to life and property in the district.

Mr. Besley: The Gaslight and Coke Company wish me to say that they, too, are desirous of assisting the inquiry by every means in their power. Plans will be provided for the use of the jury, and the Company's Chief Inspector, Mr. T. C. Hersey, will attend them to the places where the explosions occurred, and explain all details. The Company also deplore the catastrophe, which is certainly without parallel so far as they are concerned.

The jury having been sworn, proceeded to view the bodies. On their return,

Mr. Besley said the officers of the Gas Company had informed him that it would be dangerous to leave open those portions of the street that had been affected by the explosion. Unless the jury visited the place to-day, they would probably be unable to see it at all.

The Coroner observed that the jury could inspect everything that was necessary when the adjournment took place.

The following evidence was then taken:—

John Burr identified the deceased William Burr as his son.

Mary Jane Day was called to identify Beavis.

Mr. *Herbert Arthur Smith*, M.R.C.S., L.R.C.P., the senior House Surgeon at Middlesex Hospital, having deposed to the injuries received by each of the deceased, and the cause of death,

William Hawkes said: I am in the employ of Messrs. Aird and Sons, and was engaged as foreman on their main-laying works. I have been occupied in excavation work and pipe-laying all my life. On Monday evening last I was with Burr and Beavis at the trench just outside the Bedford Head Hotel at the corner of Bayley Street, where the connection of a 36-inch gas-main was to be made. The pipe was in its place in the excavation, and the deceased had to cross-cut the lead joint which is run round the plug previous to making the connection. When I last saw them they were cutting the joint out, and I was standing on the top of the pipe. It was between 6 and 7 o'clock. The mouth of the main-pipe going eastward was open, but that going westward was plugged. It was this pipe we were at work upon. There was no pressure on the main, and we took off the gauge with which we had been testing it to see that it was sound. The pipes running westward had been laid about three months, but no gas had been admitted into them. There was a ½-inch stand-pipe on the main, and when the gauge was removed I applied a light to the stand-pipe, as a precaution before removing the plug. I did this to see whether it was all safe. I applied a common lucifer match to the pipe, and as nothing came out, and it did not seem to draw in, I said to Beavis, "It is all right, we shall not require a bag;" by which I meant the bag inflated in the pipe to stop the gas. About a minute afterwards there seemed to be a rumbling noise, and then the explosion occurred, blowing out the plug in the pipe. There was a great deal of smoke, but no flame. There was a space of several feet between the ends of the pipes. Beavis was blown about 24 feet into the pipe on the opposite side of the trench, and was killed, and Burr was lying outside, groaning. While I was getting Beavis out the second explosion occurred.

By Mr. Besley: It would be about 1¼ miles eastward from the Bedford Head Hotel before you came to the "live" main in the Goswell Road. The "dead" main is shut off from the live main by means of a valve and a cap. The cap is bolted on, so that there is no flow of gas from the live main into the dead one. In speaking of "connection," I do not mean that there was anything being done to cause gas to pass through the main; it is merely getting the pipe ready to allow the gas to pass through when it is turned on. A plug had been put into the main at the point where we were at work. A plug differs from a cap in this, that it is put in with flange, and filled up with lead. For the purpose of making the connection we had to cut out the lead joint, and this was what was being done on Monday evening. We had put on the main a pressure-gauge for the purpose of testing the soundness of the joints. The gauge was on a stand-pipe. Westward of the Bedford Head the live main is a little over a quarter of a mile off, in Howland Street, where the last explosion occurred. The connection with the live main is there cut off by means of a valve, which could be worked from the surface. That valve is broken. I believe there was no gas in the main going eastward.

By the Coroner: The dead main to the westward was blown out of the ground in seven different places, but to the eastward it was undisturbed. The main is laid at a depth of 2 feet from the surface of the ground in Percy Street, and in Howland Street it is 3 feet.

David Winslow said: I am an outdoor superintendent in the employ of The Gaslight and Coke Company, and have been in the Company's service 15 or 16 years. My duty is to inspect the work done by the contractor's men. I have made daily reports as to the laying of this main to Mr. Hersey, the Company's Chief Inspector. Everything appeared to me to have been done satisfactorily. I was at the place of the accident on Monday evening about five o'clock, when the men were about to cut the joint of the plug, so as to be ready to make the connection. I am certain there was no gas in the main to the eastward, and I believe there was none in that on the west side; it was shut off by a valve in Howland Street.

By Mr. Besley: From Howland Street to the Bedford Head the ground was filled in on the 8th of May, and from the Bedford Head to Goswell Road about last Wednesday week. As far as I know, the main westward to Howland Street and eastward to Goswell Road was dead.

By the Coroner: I had not the entire supervision of the job. I was assisted by a man named M'Carthy, who took charge of a portion of the work. I am sure there was no leakage of gas into the dead main from the valve in Howland Street. I tried it a week ago, and found no smell of gas. I have no notion how the gas got into the dead main.

Mr. *Thomas Charles Hersey* said: I am Chief Inspector of The Gaslight and Coke Company, and have had 20 years experience as a Gas Engineer. I had the sole superintendence of the laying of these new pipes, which was being done by Messrs. Aird and Sons. The work was commenced in February this year, and was expected to be completed on Tuesday last. I was at the trench in Bayley Street on Monday, and the connection of the two portions of main was not then made, but all was ready. The west end of the main was closed with an iron plug fixed with lead, but the east end was open.

By the Jury: A main is plugged as a matter of precaution.

By the Coroner: I was certainly not aware of there being gas in the main; but it did not occur to me to test it. I did not think gas had come there. The valve in Howland Street was put in under my superintendence, and I know that it was sound and proper. I have no doubt that the explosion was caused through there being gas in the main to the westward. About 5 per cent. of gas combined with atmospheric air would be sufficient to create an explosive mixture, but 10 per cent. would be more dangerous. The main had not been tested with a view to seeing whether gas was present. It is my belief that gas had got mixed with the air in the main, but I cannot account for it. The theory I have formed is that gas must have escaped from a fracture in one of the smaller pipes, and found its way into the main.

The Coroner: You think the smaller mains might leak?

Witness: They might and do leak. We have leaks every day in some parts of our district.

Can you tell us what percentage of gas leaks out of the mains?—I could not say, but there is a large loss every year. Our leakage is rather lower than that of most of the London Companies, but still it is a very large quantity. Sometimes when the ground is thrown up you can smell the gas, and I have seen it accidentally lighted by a spark from a pick.

By the Jury: I have no evidence as to how the gas got into the main; it is merely my surmise.

By the Coroner: The joints are of lead. Yarn is rammed in first, then molten lead is run in to the depth of 2½ inches.

[*Hawkes*, the foreman, in answer to the Coroner, stated that there was a standing order against smoking. Beavis never smoked, and Burr but seldom.]

Examination continued: I cannot account for the explosion. I am in the same difficulty upon the subject as every one else. The gauge did not show any pressure on the main, and when the man smelt for gas only pure air came out.

A Juror: With what object was the light applied?

Witness: That was not done by my instructions.

The Coroner thought the foreman must have had some suspicion that gas was in the main, otherwise he would not have applied the light.

[*Hawkes* said he merely did it by way of precaution.]

By the Jury: A stand-pipe is a ½-inch wrought-iron pipe fixed into the main, and the pressure-gauge at the top shows the pressure in the main. If the pipe was not properly fixed so that there was an escape, the gauge might not show the pressure properly.

The inquiry was then adjourned to this day, a hope being generally expressed that in view of the importance of the matter under investigation some more suitable meeting-place might be procured than that in which the business had been so far conducted.

On the adjournment taking place, the jury, accompanied by the Gas Company's Chief Inspector, proceeded to view the several points at which the successive explosions occurred, commencing with the trench at Bayley Street, and terminating their inspection at Howland Street. At each point Mr. Hersey answered with the utmost readiness any questions put to him, and manifested the greatest willingness to afford whatever information might be considered likely in any way to assist the jury in their investigation.

St. Pancras Board of Works.—The district affected by the explosion lying within the parish of St. Pancras, a special meeting of the Board was held on Wednesday last, at the Vestry Hall, Pancras Road—Mr. Westacott, in the chair—for the purpose of viewing the spot. The Chairman said a very serious disaster had befallen the parish, doing great damage to the property of the ratepayers, for which reason he had called the members of the Board together to determine what steps should be taken.

After consulting on the legal aspect of the question, the members of the Board proceeded to the scene of the occurrence, after minutely inspecting which they returned to the Vestry Hall. Mr. Watkins, member of the Metropolitan Board of Works, then moved—"That Mr. W. B. Scott, Chief Surveyor, be instructed to report fully on the circumstances connected with the recent explosion in Tottenham Court Road, Percy Street, Charlotte Street, and Howland Street, especially as regards the extent of the damage done to the property and works in the charge of the Vestry, including, as they may be affected by the damage done, the various vaults, walls, and the areas of the houses along the line of the casualty, such report to be accompanied by such plans as may be necessary to illustrate the recital of the circumstances." Mr. Pennington seconded the motion, which was carried. It was then resolved, on the motion of Mr. Watkins, that a deputation be appointed to inspect from time to time the progress of the repairs to the roads, sewers, &c., with power to call in professional assistance.

RAMSGATE LOCAL BOARD GAS AND WATER SUPPLY.

A Special Meeting of the Ramsgate Local Board was held on Tuesday, the 29th ult.—the Rev. E. Gripper Banks in the chair—when the following report of the Engineer (Mr. W. A. Valon, A.I.C.E.) and Accountant (Mr. Alfred Lass, F.C. Accts.) was presented:—

As to the Gas Undertaking.

Engineer's Department.

The works carried out during the past year have been completed to meet a maximum daily make of 1 million, which at the present rate of increase will probably be reached in 1891 or 1892.

The principal works executed during the past year are as follows, viz.:—Increased exhausting power, each exhauster being capable of passing 30,000 feet per hour; the Livesey washer, passing 1 million cubic feet per day; the new gasholder, of a capacity of 560,000 feet; and the new sulphate works, capable of distilling the liquor produced from 15,000 tons of coal per annum. The trunk or leading mains have all been carried to their intended limit with one exception.

With regard to the mains generally, they have been entirely relaid during the last few years, and are fully equal to meet the demands of the district until it becomes necessary to distribute a larger quantity than 1 million cubic feet of gas per diem. The present retort-house is capable of producing 300,000 cubic feet per diem, and the retort-house in course of erection will contain 14 beds of retorts, capable of producing 700,000 feet per day. These retorts will be fitted with the most modern appliances, and will be charged and drawn by West's Mechanical Stoker, which is now being largely introduced into gas-works throughout the kingdom. The coal store attached to the retort-house will, when completed, be capable of storing 2000 tons of coal, the floor of which will be so arranged as to allow the coal to gravitate to one point, thus facilitating its removal. The coal will be delivered into the store by an elevator working on the automatic principle, and distributed, without employing labour for trimming. The buildings now in course of erection will probably be completed by the end of November, but the retorts will not, it is believed, be ready for use until the winter of 1881. The extension of the retort-house will necessitate the erection of additional condensers, and other apparatus used in the manufacture of gas.

Financial Department.

The accounts of the gas undertaking for the year ending March 25, 1880, have been made up and the balance-sheet prepared. The usual working statement for the same period has also been prepared.

The profit for the year has amounted to £4558 1s. 4d., which is exceedingly satisfactory when taking into consideration the reduction in the price of gas to 3s. 6d. per 1000 cubic feet, and the large amount it has been necessary to expend on the repair and maintenance account in partially renewing and re-constructing the works and plant.

During the year there has been expended on the capital account the sum of £5337 5s. 5d. The various charges as between capital and revenue have been carefully apportioned.

In accordance with section 71 of the Ramsgate Local Board Act, 1877, there has been set aside for "depreciation" the sum of £923 10s., which sum must be invested, and the interest thereupon allowed to accumulate.

There is now standing to the credit of the "sinking-fund" the sum of £1000, but by section 63 of the said Act it is not obligatory to set aside or appropriate any moneys to or for the purposes of the sinking-fund until the expiration of five years from the passing of such Act.

All moneys received by way of revenue in respect of the gas undertaking are to be applied in the manner set forth in section 74 of the said Act, and after such application the balance (if any) of the moneys so received is to be divided in equal moieties in reducing to the consumers the cost of the gas supplied, and in increasing the district fund.

From the time the gas undertaking came into your hands till the 25th day of March, 1880, the profits have been as follows, viz.:—

	Gross Profit.	Less Interest on Loans, Sinking-Fund, &c.	Net Profit.
For the year ending Dec. 31, 1877	£4813 16 3	£3001 8 7	£1812 7 8
" " Dec. 31, 1878	5952 15 9	4110 1 8	1842 14 1
" three months ending March 25, 1879	1663 18 10	1054 9 8	609 9 2
" year ending March 25, 1880	4558 1 4	3447 0 7	1111 0 9
Total net profit.			£5375 11 8

As the above sum of £5375 11s. 8d. does not include the value of the reduction in the price of gas from 4s. to 3s. 6d. per 1000 cubic feet (the benefit of which has been already received by the gas consumers), it is necessary, in order to fairly and equitably arrive at the amount to be applied in equal moieties between the gas consumers and the district fund, to make up the account in the following manner, viz.:—

Total net profit as above	£5375 11 8
Add the value of the reduction in the price of gas from 4s. to 3s. 6d. per 1000 cubic feet, taking the actual reduction upon the quantity of gas sold to the gas consumers	2755 6 0
Total amount to be divided in equal moieties between the gas consumers and the district fund	£8130 17 8
Therefore—Moiety to be apportioned to gas consumers	£4065 8 10
" " district fund	4065 8 10
	£8130 17 8

Dr. *The Consumers of Gas.*		Cr. *Per Contra.*	
Amount received by gas consumers in account, being the value of the reduction in the price of gas as above stated	£2755 6 0	Moiety apportioned as above	£4065 8 10
Balance due	1310 2 10		
	£4065 8 10		£4065 8 10

The District Fund.		*Per Contra.*	
Cash on account	£1000 0 0	Moiety apportioned as above	£4065 8 10
Cash further on account	1327 10 10		
Balance due	1737 18 0		
	£4065 8 10		£4065 8 10

Balance due to gas consumers, as per above account	£1310 2 10
" district fund "	1737 18 0
Net available balance as per balance-sheet	£3048 0 10

It will now be seen that the gas consumers are entitled to the balance of £1310 2s. 10d. in final settlement of the proportion due to them, and that the district fund is entitled to the balance of £1737 18s. in final settlement of the proportion due to that fund. The amount due to the gas consumers—viz., £1310 2s. 10d.—will be allowed to them as rebate in reduction of the amounts which will be due from them for gas consumed during the quarter ending June 24, 1880, and the amount due to the district fund can, of course, be paid to the credit of that fund.

In accordance with the foregoing report, showing a net profit from the gas undertaking of £8130 17s. 8d., the Gas and Water Committee have passed the following resolution:—"That the balance due to the district fund be paid out of the net profits, and there be also provided out of the net profits, and allowed to each gas consumer off his gas account for the quarter ending the 24th inst., a rebate equivalent to 4d. per 1000 cubic feet of gas consumed by him during the year ending the 25th of March last, fractions of 1000 feet not being reckoned."

Working Statement for the Year ended March 25, 1880.

Gas made, as per station-meter		79,048,000 cubic feet.
Gas sold—Private consumption	67,512,000	
Public lighting	7,022,600	
	74,534,600	"
	4,513,400	cubic feet.
Used on works and offices, estimated	790,480	"
Unaccounted for	3,722,920	cubic feet.

Loan capital, £80,000 = £10 5s. 3d. per ton of coal carbonized, or £1 1s. 5d. per 1000 cubic feet sold.

Coal carbonized		7,794 tons.
Gas made		79,048,000 cubic feet.
Gas sold	74,534,600	
Gas used on works and offices	790,480	
Gas unaccounted for	3,722,920	
	79,048,000	cubic feet.
Gas made per ton		10,142 "
Gas sold per ton		9,563 "
Gas sold, per cent. on make		94·29
Gas used on works and offices, per cent. on make		1·00
Gas unaccounted for, per cent. on make		4·71
		100·00
Coke made		7144 chald. 18 bush.
Coke made per ton		53 "
Coke used for fuel, per cent. on make		20·28 "
Average price of coke sold		8s. 2½d. per chald.
Tar made		89,215 galls.
Tar made per ton		11 "
Average price of tar sold		1¾d. per gall.
Liquor made	Manufactured into sulphate of ammonia.	
Liquor made per ton		
Average price of liquor sold		
Net proceeds of coke and other residuals per cent. on cost of coal		50·63

As to the Water Undertaking.

Engineering Department.

The principal work executed during the past year has been the extension of adits a distance of over 2000 feet (or a capacity of over 100,000 cubic feet), which with the old adits will give a storeage capacity of 1,200,000 gallons of water. The excavations have been highly successful, and it is estimated, when the same are completed, that the maximum yield of water will be about a million gallons of water per diem, or three times the original supply. The boilers and machinery generally have been thoroughly overhauled and repaired, and the boilers have been insured in the Manchester Steam Users Association, in the sum of £600 each.

Services for constant supply have been laid to nearly 500 houses, and the mains have already been enlarged, and valves introduced where necessary. [A long list of streets and roads about to be supplied under the constant supply system is given.] The places named in the list, situated in the higher parts of the town, although fitted with constant supply services, do not at present receive such supply, owing to their altitude. This, however, will be overcome by the tower now in course of erection at Southwood, which will give an additional average pressure of 60 feet. The height of the tower from the ground line to the top of the tank will be 65 feet, and the capacity of the tank 250,000 gallons. The tower will be connected with the Whitehall works by a new pumping-main 16 inches in diameter, capable of delivering 82,000 gallons per hour, connected with which will be two supply-mains 9 inches in diameter, one going to the East Cliff through Boundary Road, and the other running the entire length of Grange Road to the West Cliff. These will supply the whole of the high services of the town, and will be called the high-level service. The lower levels will be supplied by the present reservoir, and will be so connected by a system of valves to the high service that in case of necessity (fire or otherwise) the two may be temporarily united.

Financial Department.

The accounts of the water undertaking for the year ending March 25, 1880, have been made up, and the balance-sheet prepared.

The profit for the year has amounted to £3785 15s 6d., notwithstanding the heavy charges which have been made against the revenue account. There has been expended during the year on capital account the sum of £7712 5s. 9d., and all the charges as between capital and revenue have been carefully apportioned.

All moneys received by way of revenue in respect of the water undertaking are to be applied in manner set forth in section 74 of the Ramsgate Local Board Act, 1877, and after such application the balance (if any) of the moneys so received shall be applied in equal moieties in reducing to the consumers the cost of the water supplied, and in increasing the district fund.

From the time the water undertaking came into your hands till the 25th day of March, 1880, the profits have been as follows:—

	Gross Profit.	Less Interest on Loans, &c.	Net Profit.
For the year ending Dec. 31, 1877	£2572 12 9	£2398 16 11	£173 15 10
" " Dec. 31, 1878	3980 10 0	3085 3 8	895 1 4
" three months ending March 25, 1879	845 8 3	796 17 6	48 10 9
" year ending March 25, 1880	3785 15 6	3593 6 9	192 8 9
Total net profit or net avalable balance, as per balance-sheet, March 25, 1880			£1309 16 8

The water consumers are entitled to one-half of the above sum, and the district fund is entitled to the other half thereof; but looking at the heavy charges which during the current year will in all probability have to be made against the revenue account, in conjunction with the fact that no sums have been set aside towards the formation of either the depreciation-fund or the sinking-fund, there is a question whether, under existing circumstances, it will not be advisable to postpone the division of the above profits until some future time.

(Signed) William A. Valon, A.I.C.E., Engineer.
Alfred Lass, F.C.Accts., Accountant.

The Chairman, in moving the adoption of the report, said: The report which I have had the pleasure to submit to you, shows that the Gas and Water Committee, in conducting the concerns under their charge, have used their judgment successfully, and have been able, during the last two years, to not only pay the interest necessary for borrowed capital, but also to materially reduce the price of gas, and leave a large sum in hand, which is now about to be divided between the consumers and the general district rate, the latter being entitled from the gas account to £3065 8s. 10d. in addition to £1000 already paid, and the consumers to a further reduction in the price of gas in the shape of a rebate of 4d. per 1000 feet on all gas consumed during the year ending March 25 last, which will be allowed on the accounts for the June quarter, thus making the price for the year 3s. 2d. per 1000 cubic feet, which together with the equal moiety given to the general district fund makes the selling price 2s. 10d. In addition to this sum you have placed £1000 to the sinking-fund, which will relieve you from the necessity of further adding to it for the next two years. You have also, while expending very large sums of money for repair and maintenance—£2060 being expended during the past year—set aside a sum of £923 10s. to the depreciation-fund. The Commissioners, when the works were first handed over to their care, found it necessary without delay to take in hand work which had already been too long postponed, carrying them forward for the last two years, so as to provide for future consumption of gas, and at the same time taking advantage of modern improvements so as to cheapen the manufacture. The work executed during the last two years is already well known to you. I need only add that you have extended and relaid mains over nearly 5¾ miles of streets. This, with other means adopted by the Committee, has largely tended to augment the average percentage of increase. The total increase in gas sold since the works became the property of the town is 41·5, showing the absolute necessity of the work now in hand being carried out speedily. Last year it was decided to sell or let gas-stoves on hire on the three years system, and up to March 25 last 51 stoves have been brought into use,

which I need not add must considerably increase the consumption of gas. Neither should the fact be forgotten that the public lamps are lighted at, as nearly as possible, prime cost, and this is a benefit of no mean order, for by this means you have been enabled to make Ramsgate one of the best lighted towns round the coast. It will, of course, be remembered that the public lighting of the town was the primary cause of the disturbance between the Commissioners and the late Gas Company. It will be within the recollection of most of the Council that for a part of one quarter the streets were left unlighted altogether, in endeavouring to combat the exorbitant price sought to be imposed by the Company; but as this resulted in the gas and water concerns being handed over to ourselves, it may now be looked upon as a source of congratulation. It may not be generally known that the price charged for public lamps is 10 per cent. less than to private consumers, and that the rebate will be allowed equally on the consumption by public lamps as on the accounts of private consumers. The number of lamps, including those in the added area, is nearly 500. I will now just refer to the working statement prepared by Mr. Alfred Lass, which I may safely designate one of the most satisfactory ever presented to a company or corporation. The gas made, as per station-meter, was 79,048,000 cubic feet; leakage or unaccounted-for gas being only 4·71. The gas sold per ton was 9563 cubic feet, which is the average make in most works from a ton of coal. The return for residual products is also very satisfactory, the net proceeds for coke and other residuals on the cost of coal being 50·63 per cent., or a return of more than one-half the cost. This is not due to the fact of any large quantity of sulphate of ammonia being disposed of, as the manufacture of this article has only just commenced, but from this source the Committee may expect a large return during the current year. The works themselves are, I believe, as complete as forethought, design, and care can make them, and are capable of distilling the liquor produced from 15,000 to 20,000 tons of coal per annum, the salt produced being of the best quality, as shown by Dr. Voelcker's certificate, containing, as he says, 24·71 per cent. of fixed ammonia, the maximum quantity being 25 per cent. The fuel used was 20 per cent., and the average price of coke sold 8s. 2½d. per chaldron. With respect to the water undertaking, my remarks on this head must be equally laudatory as with the gas, for you were solemnly warned, in purchasing this concern, of its rottenness (which has been discovered), and the positive loss which would result in attempting to supply water to the town. No doubt the "croakers" were perfectly correct as to the state of the mains and services, and also as to the inadequacy of the then existing source to keep the town properly supplied; and here again the Committee had to deal promptly with a condition of things to enable them to continue a satisfactory supply, and also to carry out the work necessary to meet the requirements stipulated for in their Act of Parliament for giving a constant supply. Nevertheless, although the Committee have been compelled to go to the limit of their borrowing powers and raise all the capital they are empowered (except what may be granted in the Provisional Order), they have, contrary to predictions, been not only able to pay interest on the outlay of the necessary capital, but also to spend out of revenue a reasonable amount for repair and maintenance of works, still leaving a balance in hand of £1300 16s. 8d. As you will see from the report, the boilers and engines, fair wear and tear excepted, may not now be expected to require any large outlay for some time hence. It is a source of congratulation to see the success which has attended the extension of the adits, by which the original supply has been nearly trebled, thus giving not only the advantage of an ample quantity, but will relieve you of the necessity of keeping up two stations. The well at Southwood being no longer required, the whole of the pumping will be done at Whitehall. The Committee have, as explained in the report, provided for the higher levels by erecting a tower covered with a tank 50 feet by 80 feet by 10 feet, having a capacity of 250,000 gallons. This, as already stated, will supply the upper parts of the town, and the present reservoir the lower levels. It has also been resolved to lay services for constant supply free of cost, the Committee feeling they were dealing with a difficulty which could not be met in any other way whatever. A large expenditure has, as will be seen by the balance-sheet, also been incurred to lay mains for opening up building sites in different parts of the town, the total quantity of all sizes amounting to about 6½ miles. As stated in the foregoing, the expenditure has been met by the existing rates, and it is hoped you will be able to continue doing so, although some alterations will, of course, be rendered requisite. By these means the Committee trust they will not be compelled to raise the present excessively low water-rate. The Committee have finished driving tunnels, a work which has extended over twelve months, and in the course of a few days the adits will be closed, we hope for some years to come. The Committee are endeavouring to put both their gas and water works in substantial repair and good working order, and thus enable them to meet the present demand, and provide intelligently and economically for the increased requirements of the future; believing in the sound commercial axiom that "it is not they who spend least who are the greatest economists, but those who spend most judiciously."

Mr. Rood said the Gas and Water Committee deserved the thanks of all the inhabitants of the town as well as the Board, and he wished to move a vote of thanks to the Chairman and to the Committee.

Mr. Barnes seconded the motion.

Mr. Hickson said he went over the works the other day, and he considered that the thanks of the Board were also due to Mr. Valon. The buildings there were well done, and of great stability, so that they would have something for the money expended. The works were planned and carried out in the best possible manner, and in a way which reflected the greatest credit on Mr. Valon. He was very glad they had not interfered with that gentleman's duties at the gas-works, by giving him other work, and he trusted Mr. Valon would remain at the gas-works for a very long time, where he would be a most valuable servant to the Board.

Mr. Rood said he was quite willing to include Mr. Valon in the vote of thanks, which was then passed, and the Board adjourned.

THE HANLEY TOWN COUNCIL AND THE BRITISH GAS COMPANY.

The Usual Monthly Meeting of the Hanley Town Council was held on Tuesday, the 29th ult.—the Mayor (Mr. J. Bromley) presiding—when the following report was presented:—

At the Meeting of the General Purposes Committee on the 22nd of June, Mr. Hammersley reported the results of the opposition in the House of Lords to the Bill of the British Gaslight Company. It was moved by Councillor Hammersley, and seconded by Alderman Powell—"That the best thanks of the Committee and the Council be given to those gentlemen who attended in the House of Lords to assist in the opposition of the Bill of the British Gaslight Company." This resolution being carried, it was also resolved—"That the best thanks of the Committee be given to those members of the Council, who, at the sacrifice of much time and trouble, have rendered valuable assistance in the opposition of the above-named Bill." It was moved by Alderman Powell, and seconded by Alderman Ridgway—"That the opposition of the Bill be continued in the House of Commons."

Alderman Gilman moved the confirmation of the report, observing that the Corporation had obtained nearly all they wanted in the Lords, and if they pursued the opposition to the House of Commons he had no doubt whatever they would then get everything they wanted.

Alderman Cartledge seconded the motion.

Mr. Miller thought that the opinion of the Council should be canvassed on the question of further opposition to the Bill. They had been told that the Corporation had obtained nearly all they wanted, but he (Mr. Miller) could not for the life of him see what it was they had gained. They had really gained nothing, but had lost something, for they had lost the cost of the opposition, and as the ratepayers were already clamouring against this, he considered that it would be unwise to follow the Bill to the House of Commons, and incur further expense. To do this would be neither just nor right. The ratepayers had been put to great expense when they could least afford it, and in an indirect way the gas consumers would have to pay the Company's expenses, and as the gas consumers were also ratepayers they would have to pay in a twofold way. He moved as an amendment that the portion of the report relating to the further opposition of the Bill be not adopted.

Mr. Bradford seconded the amendment, and complained of the sparing manner in which the General Purposes Committee had dealt with the matter. The report did not tell them anything of what the Corporation had done. All the Committee seemed to have done was to pass resolutions thanking themselves for doing nothing. This, perhaps, might be a little satisfaction to those who had some qualms of conscience at having fought another losing game; but he was anxious to know what they had to thank these gentlemen for. He did not see what they had done; but everybody knew what they had not done. All they seemed to have achieved was a reduction of the capital the Company asked for from £75,000 to £50,000, and reduced the rate of interest from 7½ to 5 per cent. As regarded the former, when a Company sought such powers from Parliament they never expected to have all they asked for, therefore they had obtained now, no doubt, more than they wanted; and as to the latter, what difference would it make to the consumers?

Mr. Palmer: It is estimated to make a difference of £2400 a year.

Mr. Bradford said that this would be gained only under circumstances which he believed would never occur; and he again protested against spending further money in going to the House of Commons for what had been refused them in the House of Lords. He urged that it would be unkind to put the ratepayers to further expense.

Mr. Cooke contended that the Council had gained a great deal by their opposition to the Bill, and reviewed the progress they had made since the Corporation offered the opposition in 1877. He said that, not only by the recent opposition had the proposed expenditure of the Company been reduced one-third—namely, from £75,000 to £50,000, but the rate of interest had been reduced from 7½ to 5 per cent.; and the Corporation had also gained power to go to the Company's offices at any time and examine the quality of the gas. The recent opposition had only cost about £800, and he did not think it probable that the opposition before the House of Commons would cost so much. He, therefore, urged the Council to continue the opposition, and argued that the cost of it would be little indeed to the ratepayers compared with the advantages they would gain. The tendency of modern legislation had been to take from unwilling sellers that which was for the public good. It was no injustice to the Company to make them sell their works; for they said themselves that they could not make them pay. The Corporation were not a rival Company—it would be far different if they were—but a public body, and they offered to the Company £2 5s. for every £1 they had laid out, with the full assurance that they could make the undertaking pay. It came out in London that the Company were paying 50 per cent. more for coal than was paid at Stoke, and that they sold their residuals at about 50 per cent. less. He then defended the gentlemen to whom it was proposed to give the votes of thanks, observing that the resolution was not passed by those who went to London, but by the other members of the Committee, and most of the gentlemen in question were not members of the Committee at all, but gentlemen from neighbouring towns, who had been to London to give evidence for the Corporation.

Mr. Bradford said his remarks were intended to apply to those who went to London as part of the deputation, but not to give evidence.

Mr. Cooke said that surely such gentlemen as the Mayor of Stoke, the Mayor of Burslem, and the Chief Bailiff of Tunstall deserved the thanks of the Council for going to London for them; as did also the members of the Council who, at the sacrifice of time, business, and personal comfort and convenience, also went.

Other speakers defended the action of the Committee; and, upon the amendment being put, only the mover, seconder, and Mr. Turner voted for it.

The motion was then put as a substantive one, and carried.

Last Thursday's *Staffordshire Sentinel* says: "It is rumoured that the Gas Committee of the Hanley Town Council has made an offer of £180,000 to the British Gaslight Company for their Hanley undertaking—not as a conclusive sum, but as a basis for negotiations. It is understood, however, that the offer has been rejected by the Company." We have not heard any confirmation or denial of this rumour.

TRADE NOTES FROM SCOTLAND.

(from our own correspondent.)

A reduction in the price of gas amounting to 10d. per 1000 cubic feet—from 6s. 8d. to 5s. 10d.—has been made by the Tillicoultry and Devonside Gas Company; and a reduction has also been made in the meter-rent, from 2s. 6d. to 2s. per annum.

At a recent meeting of the Blantyre Gas Company, Limited, it was agreed to reduce the price of gas from 5s. to 4s. 7d. per 1000 cubic feet.

The Rating Committee of the Kirkintilloch Burgh Gas Commissioners held a meeting on Monday, the 5th inst., when the accounts for the past year, together with the prospective accounts, were submitted. After they had been fully considered it was unanimously agreed to recommend to the Commissioners a reduction of 5d. per 1000 feet in the price of gas. The present rate is 5s. per 1000 feet, at which it has stood for a number of years.

The annual meeting of the Kilwinning Gaslight Company was held last Tuesday—Mr. T. Fulton presiding. The Directors laid before the meeting the printed accounts of the revenue and expenditure for the past year, being the 43rd balance-sheet prepared by the Secretary to the Company (Mr. King). It was resolved that the price of gas for the current year should be continued at 4s. 2d. per 1000 feet; and in terms of a recommendation from the Directors, it was agreed to declare a dividend of 8s. per share from the profits of the past year.

On Wednesday last the Shareholders of the Ayr Gas Company held their 35th annual general meeting in the Town Buildings. Dr. Ronald, Chairman of the Board of Directors, occupied the chair. The Directors reported that their accounts for the year ending 1st of February last had been examined by Mr. Robert Cameron Cowan, the Auditor of the Company. They proceeded to say that in order to increase the productive power of the works so as to supply the increased demand made upon them for gas, they had taken down the older bench of retorts, and rebuilt it on an improved principle, that the retorts now amounted to 44, and that the whole works were in excellent repair. The average illuminating power of the gas supplied during the year was 27 candles, and the price

5s. per 1000 feet, at which it is to be continued. A dividend of 7½ per cent. was declared—the same as last year. On the motion of the Chairman, the retiring Directors—Mr. Cuthbertson, Mr. Robertson, and Mr. Bayne, —were unanimously re-elected.

The Newton-on-Ayr Gas Company held their annual general meeting on the 1st inst., when a dividend of 7 per cent. was declared, being 1 per cent. better than last year. It was resolved to continue the price of gas at 5s. 5d. per 1000 feet, as against 5s. across the river in Ayr proper.

A dividend of 6 per cent. on the profits of last year was declared at the annual general meeting of the Shareholders of the Blairgowrie Gas Company, which was held last Wednesday.

The annual meeting of the Coupar-Angus Gaslight Company was held in the Royal Hotel last Wednesday—Mr. David Buttar, of Corston, in the chair. The report of the Directors showed that the quantity of gas sold during the past year exceeded that of the preceding, that a number of new pipes had been laid in the place of old ones, and that the leakage had been very much reduced. A dividend of 7½ per cent. per annum was declared—the same as it has been for some years past. It was agreed to reduce the price of gas from 7s. 6d. to 7s. 1d. per 1000 cubic feet. The report was adopted, and Messrs. Buttar, Lawson, Lowson, Robertson, and Inches, were elected Directors for the year, the two first named being re-elected.

A dividend of 7½ per cent. has just been declared by the Leslie Gas Company, and the price of gas is to be continued at 5s. 10d. per 1000 feet.

At the annual general meeting of the Anstruther and Cellardyke Gas Company, held last Wednesday—Mr. Murray, J.P., in the chair—it was unanimously resolved to pay a dividend of 8 per cent., and a bonus of 5 per cent., and to reduce the price of gas from 5s. 10d. to 5s. per 1000 feet. Bailie Sharp and Messrs. Mackintosh and Adamson were appointed Directors in room of those retiring, and Bailie Darsie and Mr. Fortune were elected Auditors.

The Shareholders of the Kirriemuir Gaslight Company held their annual general meeting last Thursday—Mr. John Ogilvy, Chairman of the Company, presiding. The Secretary submitted the annual report, which was approved of. A dividend of 3 per cent. on the increased stock of the Company was declared, being equal to 7½ per cent. on the original stock. In consequence of the large outlay in connection with the extensions and improvements of the works this year, no alteration was made in the price of gas.

On Monday, the 5th inst., the annual general meeting of the Brechin Gaslight Company took place, when a dividend of 12½ per cent. was declared, being 25 per cent. on the original £5 shares; and the price of gas was continued at 4s. 7d. per 1000 feet.

At the annual meeting of the Alyth Gas Company, held on Monday of last week—Mr. G. Duncan in the chair—it was resolved, in view of the Company not being so prosperous during the past year, to limit the dividend to the Shareholders to 6 per cent., being 2 per cent. lower than what was divided in some previous years.

The annual general meeting of the Crieff Gaslight Company was held on Monday, the 5th inst.—Dr. Meikle, Chairman, presiding. The accounts of charge and discharge, for the year ending June 15 last, were read and approved of. The retiring Directors—Messrs. P. Hamilton, T. H. Meikle, M.D., and J. Adie—were re-elected. Mr. R. Clark was elected a Director in room of the late Mr. Ironside, and the Rev. John M'Dougall, of Orchill, in the room of the late Mr. Brown. The Rev. Dr. Cunningham and Mr. John M'Leod were re-appointed Auditors for the ensuing year. A dividend at the rate of 10 per cent. was declared.

Edinburgh gas stock was selling at £45 15s. per share on Tuesday of last week, and on the following day buyers were offering an advance of 5s. per share. On the same day the Glasgow Corporation 9 per cent. gas annuities were selling at £221 per share.

The Banff Gaslight Company have reduced the price of gas to 6s. 8d. per 1000 feet, and allowed a discount of 5 per cent. to consumers to the extent of £15 worth of gas per annum.

A good deal of excitement was shown in the Glasgow pig iron market last week, accompanied by considerable fluctuations in price. Business was done on Friday afternoon at 52s. cash and 52s. 1½d. one month, and a large amount of business was done in warrants during the day.

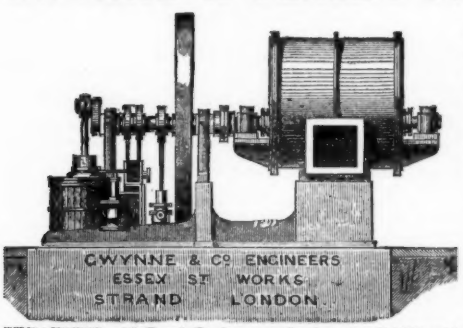
The coal market continues much in the same condition that has prevailed for several weeks past. Orders for all kinds are scarce, and values are low.

Reductions in the Price of Gas.—At last week's meeting of the Salford Town Council a recommendation of the General Gas Committee in reference to the price of gas was agreed to: "That the price of gas be reduced from the 1st of July as follows:—From 3s. 3d. per 1000 cubic feet to 3s., to consumers within the borough of 250,000 cubic feet per quarter; from 3s. 4d. per 1000 cubic feet to 3s. 1d., to consumers within the borough below 250,000 cubic feet per quarter; from 3s. 10d. per 1000 cubic feet to 3s. 9d., to all consumers within a radius of five miles from the Regent Road works."——The Directors of the Kidderminster Gas and Coke Company have announced that for the quarter ending Sept. 30, and until further notice, the price of gas will be reduced 2d. per 1000 cubic feet. The following scale of charges will, therefore, rule:—For a quarterly consumption under 50,000 feet, 3s. 4d.; 50,000 and under 250,000 feet, 3s. 3d.; 250,000 feet and upwards, 3s. 1d.——The Uttoxeter Gas and Coke Company, Limited, have again reduced the price of gas from 4s. 2d. to 3s. 9d. per 1000 feet; with a discount of 10 per cent. to all consumers of 30,000 feet and upwards in a year.

Excursion of the Employés of the Crystal Palace District Gas Company.—It has now for many years past been the custom for the Directors of the Crystal Palace District Gas Company to provide the funds necessary for the whole of the *employés* of the Company, together with their wives and friends, to enjoy annually a day's holiday together, the numbers pretty well evenly divided, so that by a little arranging the Company's operations are not interrupted. This year the place decided upon for visitation was the Alexandra Palace, and thence by special train the first half were taken last Tuesday. The Palace was reached by 11 o'clock, and the programme of amusements, at this well-known place of resort by Londoners, was extensive and varied enough to afford a thoroughly pleasant day for every one—whatever his or her tastes and inclinations. Dinner was served in the large saloon at one o'clock, and a very substantial meal was provided; after which Mr. Magnus Ohren, the Secretary of the Company, proposed "The Health of the Directors of the Crystal Palace District Gas Company," by whose liberality those present were enjoying a day's outing, while the rest of the *employés* would be similarly treated a week hence (to-day). With the toast Mr. Ohren coupled the name of the Engineer (Mr. C. Gandon), a proposal which met with most enthusiastic reception. Mr. Gandon, in responding, expressed his thanks for the flattering manner in which the mention of his name had been received; referred to the way in which Mr. Ohren was instrumental, years ago, in commencing such excursions as the present; and assured all of the kindly feeling he entertained for those with whom he was brought in contact in their daily work. The company then separated to meet again at five o'clock for tea; and the return journey commenced at eight o'clock, all being safely landed about half-past nine, after what may be considered a highly successful day's pleasuring.

The GRAND MEDAL of MERIT at the VIENNA EXHIBITION, TWO MEDALS at the PHILADELPHIA EXHIBITION and TWO MEDALS at the PARIS EXHIBITION, have been AWARDED to GWYNNE & CO. for GAS-EXHAUSTERS, ENGINES, and PUMPS; Also 27 OTHER MEDALS AWARDED at all the GREAT INTERNATIONAL EXHIBITIONS.

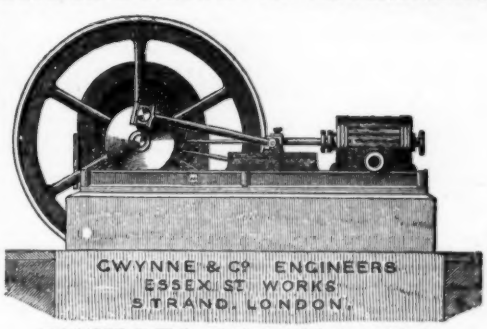
GWYNNE & BEALE'S PATENT GAS-EXHAUSTERS & ENGINES.



EXHAUSTER with Trunk Engine, capable of passing 210,000 cubic feet per hour.

The Judges report on the combined Exhauster and Steam-Engine exhibited at the Philadelphia Exhibition is—"*Reliable compact Machine, well adapted for the purpose intended, of excellent workmanship.*"

GWYNNE & CO. have made the largest and most perfect Gas-Exhausting Machinery in the world, and have completed Exhausters to the extent of 8,000,000 cubic feet passed per hour, of all sizes from 2000 to 210,000 cubic feet per hour.



52,500 EXHAUSTER, with Horizontal Engine combined.

GWYNNE & CO. do not pretend to enter into a struggle with other makers in respect to cheapness. They have never sought to make price the chief consideration, *but to produce machinery of the very highest quality, and most approved design and workmanship.* The result is that in every instance their work is giving the fullest satisfaction. Numerous testimonials and references can be given to Companies using their Machinery for years past.

Exhausters, with or without Engines combined, can be made to pass the gas WITHOUT OSCILLATION OR VARIATION IN PRESSURE Regulators, Bye-Passes, Stop-Valves, Gas-Valves, Station Governors, and Gas Machinery of all Sizes.

PLEASE ADDRESS IN FULL, GWYNNE & CO., Hydraulic and Gas Engineers, ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C., ENGLAND.

Gwynne & Co.'s New Catalogue on Gas-Exhausting and other Machinery may be obtained on application at the above Address.

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FIRE-CLAY GAS-RETORTS & FIRE-BRICKS,

Of every size and shape, and of the best quality; also of White and Coloured GLAZED BRICKS, SANITARY PIPES, &c., &c.

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WANTED, Readers of the NEW Edition, "Cooking & Heating by Gas;" on Burners, &c. Copies, by post, Threepence, direct from the Author, MAGNUS OHREN, Assoc.M.I.C.E., Gas-Works, SYDENHAM.

WANTED, by a Young Man (married), a Situation in a Gas-Works. Is the son of a Manager, and is a good Main and Service Layer. Can do any Fittings in the Retort-House; also can Fix and Read Indexes of Meters, and has had experience both at Lathe and Vice. Very steady.
Apply to the MANAGER, Gas-Works, Crayford, KENT.

WANTED (Single-handed), a Man to Make the Gas and do any Fittings required to the Pipes, &c.
Apply to J. PICKERING, Ingestre, STAFFORD.

WANTED, two active and experienced men as WATER-WORKS FITTERS to the Luton Water Company. They must be able to Lay Mains, Attach Lead and Iron Services, do Plumbing, and be well up in Water-Works matters generally. They must be steady, industrious men, and well recommended.
Apply, stating age, wages required, with other particulars, to Mr. T. F. MIDDLEMISS, Engineer and Manager, Water Company's Offices, Luton, BEDS.

FOR SALE—Single Gasholder, 158 ft. by 30½ ft. in good condition, to be taken out early next year, and replaced by S. C. & Sons with a Treble Lift. Excellent Guide Framing, consisting of 20 handsome Columns and wrought-iron Girders. May be seen at work at the Gas Works, Portsea.
Particulars on application to S. CUTLER AND SONS, Millwall, LONDON, E.

ON SALE—The Cast-Iron Fire Doors, Mouthpieces, Ascension, H, and Dip Pipes, Hydraulic Mains, &c., belonging to six settings of six retorts; also One Station Meter to pass 8000 feet per hour (makers West and Gregson).
The above are in capital condition, and can be seen at the Gas-Works, Guildford. No reasonable offer refused.
Further particulars on application to Mr. LONGWORTH, Gas Offices, GUILDFORD.

THE Gloucester Gas Company, ceasing to manufacture gas at their old works, will have the undermentioned APPARATUS for Sale about the beginning of August, viz.:—
About 150 feet of D-shape Wrought-Iron Hydraulic Main, size 19 in. by 19 in. Also about 38 ft. of D-shaped Wrought-Iron Hydraulic Main, size 20 in. by 20 in. Annular Condenser, consisting of six Vertical Pipes, 24 in. diameter, 19 ft. high, with three 12-in. Slide-Valves and 12-in. Connections.
Scrubber (round), 5 ft. by 20 ft., with three 12-in. Slide-Valves, and 12-in. Connections.
Exhauster (Jones) to pass about 15,000 feet per hour.
Exhauster (Beales) to pass about 25,000 feet per hour.
Two Vertical Steam-Engines, each about 6-horse powe with Pulleys, and Shafting used for driving the above.
Boiler 14 ft. 6 in. by 8 ft. 6 in., with Centre Tube, and four Galloway Patent Tubes.
4-horse power Horizontal Steam-Engine.
Three 4-in. Pumps, with cranked Shafting and a pair o Mitre Wheels.
Two Purifiers, 16 ft. by 8 ft., with six 12-in. Slide-Valves and 12-in. Connections.
Gasholder, Double Lift, with Cast-Iron Tank, capacity 37,000 feet.
Gasholder, Double-Lift, capacity 100,000 feet.
Gasholder, Double Lift, capacity 240,000 feet.
One 12-in. Governor, by Wright, London, with 12-in. Valves, Bye-Pass, and Connections.
Two 12-in. four-way faced Valves, by Cockey.
For further information, &c., apply to the undersigned.
R. MORLAND, Engineer.

CIRENCESTER GAS COMPANY, LIMITED.

THE Directors are prepared to receive TENDERS for the Supply of 800 Tons of Real Old Silkstone GAS COAL, 1000 Tons of Best Forest of Dean GAS COAL, and 300 Tons of through Welsh COAL, to be delivered at Cirencester Station during the next Twelve months, in such quantities and at such times as the Company's Manager may direct.
Also for the Purchase of the Company's COKE, to be removed from the Works as required by the Manager.
Tenders to be sent to J. BUCHAM, Secretary to the Gas Company, 76, Castle Street, CIRENCESTER, on or before the 26th of July inst.

GAS PLANT FOR SALE.

THE Maidstone Gas Company having enlarged their Works, offer the following Apparatus for Sale in good condition:—
SCRUBBERS.—One Tower Scrubber 30 ft. high by 10 ft. diameter, with Distributor, and partly fitted with Livesey's boards.
CONDENSERS.—One Set of Annular Condensers, consisting of 9 Pipes 17 ft. high, outer diameter 2 ft. 6 in., fitted with 12-in. Valves complete.
ENGINES.—Two 12-Horse Power Horizontal Engines in very good condition.
STATION-METER.—By Milne and Son, in first-class condition, ornamental case, with Valves and Bye-pass complete; to pass 20,000 cubic feet per hour.
HYDRAULIC MAIN.—Six 8 ft. by 18 in. Hydraulic Main D wrought iron; 24 8 ft. 9 in. by 18 in. Hydraulic Main D wrought iron. Nearly new.
BRIDGE AND ASCENSION PIPES.—90 6 in. by 4 in. Bridge-Pipes, and a quantity of 6-in. Ascension-Pipes and Bends.
RETORTS.—31 Rounds, 15 in. diameter and 9½ ft. long, in two pieces. 2 Ovals, 21 in. by 15 in. and 9 ft. long, in one piece. All of Stourbridge Fire-Clay, and in good condition.
For further particulars and price apply to
JOHN WEST, Engineer and Manager.
Gas Works, Maidstone, April 21, 1880.

TO GAS AND PETROLEUM CONTRACTORS AND OTHERS.

THE Local Board of Health for the Dis- trict of Watford, Herts, are prepared to receive TENDERS for LIGHTING the Public STREET LAMPS belonging to them, with Gas or Petroleum, or by other means, for Twelve consecutive calendar months, commencing on the 14th of August next.
The specification can be inspected on application to Mr. C. C. Lovejoy, the Board's Surveyor, on and after Wednesday, the 14th inst.
Sealed tenders, marked "Tender for Lighting," must be delivered at my Office not later than 6 o'clock p.m. on Thursday, Aug. 5 next.
The Board do not bind themselves to accept any tender.
By order of the Board,
JOHN SEDGWICK, Clerk.
66, High Street, Watford, July 9, 1880.

TO TAR DISTILLERS AND OTHERS.

THE Directors of the Radcliffe and Pilkington Gas Company are prepared to receive TENDERS for the Purchase of the Surplus TAR produced at their Works, Egerton Street, Radcliffe, for the period of One year from August, 1880.
Any further information may be obtained on application to the undersigned, to whom tenders, stating the price per ton of 20 cwt., must be sent on or before the 26th inst.
The Directors do not bind themselves to accept the highest or any tender.
ANDREW DOUGALL, jun., Manager and Secretary.
Gas-Works, Radcliffe, near Manchester, July 9, 1880.

TO COAL MERCHANTS.

THE Directors of the Radcliffe and Pilkington Gas Company are prepared to receive TENDERS for the Supply of Best Screened GAS COAL and CANNEL, to be delivered at the Radcliffe Goods Station in quantities as they may from time to time require, for a period of One, Two, Three, or more years as may be agreed upon, commencing Dec. 1, 1880.
It is estimated that 6000 tons of Coal and 3000 tons of Cannel will be required per annum.
Persons tendering are requested to name the colliery from which they propose to supply.
Tenders must be sent to me on or before the 26th inst.
The Directors do not bind themselves to accept the lowest or any tender.
ANDREW DOUGALL, jun., Manager and Secretary.
Gas-Works, Radcliffe, near Manchester, July 9, 1880.

CONTRACT FOR GASHOLDER, &c.

THE Mayor, Aldermen, and Burgesses of the Borough of Aberavon invite TENDERS for the Construction of a GASHOLDER, 50 ft. in diameter and 16 ft. deep, and also for the construction of Two PURIFIERS, 8 ft. by 8 ft. by 4 ft., with Lifting Apparatus and Centre-Valve and Connections; according to plans and specifications, copies of which can be had on application to Mr. John Henderson, Manager of Gas-Works, Aberavon, South Wales, on payment of half a guinea.
Sealed tenders to be lodged with MARMADUKE TENNANT, Esq., Town Clerk, Aberavon, SOUTH WALES, on or before the 26th of July inst.

WEST BROMWICH.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the West Brom- wich Improvement Commissioners are prepared to receive TENDERS for the Purchase of the Surplus GAS TAR (say 900 tons) for the year ending July 1, 1881.
Sealed tenders addressed to me, and endorsed "Tender for Gas Tar," must be delivered here before Tuesday, the 20th of July inst.
Further particulars and forms of tender may be obtained on application to me.
The Committee do not bind themselves to accept the highest or any tender.
CHAS. H. BAYLEY,
Clerk to the said Commissioners.
Town Hall, West Bromwich, July 3, 1880.

WEST BROMWICH.

AMMONIACAL LIQUOR.

THE Gas Committee of the West Brom- wich Improvement Commissioners are prepared to receive TENDERS for the Purchase of AMMONIACAL LIQUOR produced at their Albion Works, West Bromwich, for a period of Two, Three, or Four years. Separate tenders for each term required. The Liquor to be delivered into Canal barges at the Albion Gas-Works.
Further particulars and forms of tender may be obtained on application to me.
Sealed tenders addressed to me, and endorsed "Tender for Ammoniacal Liquor," must be delivered to me before the 20th of July inst.
The Committee do not bind themselves to accept the highest or any tender.
CHAS. H. BAYLEY,
Clerk to the said Commissioners.
Town Hall, West Bromwich, July 3, 1880.

LOCAL BOARD OF HEYWOOD.

TO CONTRACTORS AND BUILDERS.

THE Heywood Local Board are prepared to receive TENDERS for the following:—
Contract No. 1.—The Erection of a PURIFYING-HOUSE of Brick relieved with Stone, on the site of their Gas-Works, Hooley Bridge, Heywood.
The drawings and specification may be seen at the Board's Offices, and at the Offices of the Engineer, Mr. Thomas Newbigging, 5, Norfolk Street, Manchester. Copies of the specification, bill of quantities, and form of tender may be obtained from the Engineer on payment of One Guinea, which will be returned on receipt of a *bonâ fide* tender.
Sealed tenders, endorsed "Tender for Purifying-House, Contract No. 1," to be addressed to the Chairman of the Gas Committee, and delivered to the undersigned not later than the 26th of July inst.
The Board do not bind themselves to accept the lowest or any tender.
By order,
JOHN BANKS, Clerk to the Local Board.
Office of Local Board, Heywood, July 12, 1880.

RAMSGATE IMPROVEMENT COMMISSIONERS, GAS AND WATER DEPARTMENT.

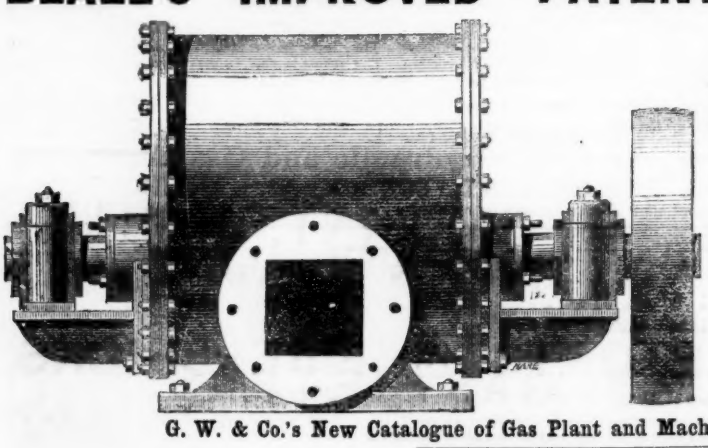
GAS-WORKS.

THE Gas and Water Committee invite TENDERS for Cast-Iron PIPES and Special Castings, together with about 20 tons of Wrought-Iron Girders and 55 tons of 1-in. Cast-Iron Floor Plates, particulars of which may be had and drawings seen on application.

WATER-WORKS.

Tenders are also invited for about 7200 ft. of 16 in. Iron Pipe; 7000 ft. of 9-in. Iron Pipe; and 510 ft. of 12-in. Iron Pipe, together with from 30 to 40 tons of Special Castings, particulars of which can be obtained on application.
Tenders, which must be sent in not later than 10 a.m. on Thursday, July 15, addressed to the Chairman of the Gas and Water Committee, Gas-Works, Ramsgate, to state price per ton for Special Castings, and per foot run for Pipes.
The Committee do not bind themselves to accept the lowest or any tender.
WILLIAM A. VALON, Engineer.
July 1, 1880.

BEALE'S IMPROVED PATENT GAS EXHAUSTERS,



WITH OR WITHOUT
WROUGHT-IRON SPINDLES AND
ENGINES COMBINED.

GEORGE WALLER & CO.,
MAKERS OF
ENGINES, EXHAUSTERS,
INDEX AND DISC GAS-VALVES,
HYDRAULIC MAIN VALVES,
BYE-PASS VALVES,
TAR, LIQUOR, AND OTHER PUMPS,
SCRUBBERS AND PURIFIERS,
CONDENSERS, BOILERS, &c.

G. W. & Co.'s New Catalogue of Gas Plant and Machinery can be had on application.

PHŒNIX ENGINEERING WORKS:
HOLLAND STREET, SOUTHWARK, S.E.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT, having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their invention may be secured for Six Months; or LETTERS PATENT, which are granted for Fourteen Years.

Patents completed, or proceeded with at any stage, thereby rendering it unnecessary for persons resident in the country to visit London.

Patents procured for Foreign Countries.

Information as to cost, &c., supplied gratuitously upon application to the Advertiser, 22, Great George Street, WESTMINSTER.

Imperial
METER COMPY.,
LIMITED,

Makers of THE IMPROVED DRY GAS-METERS, THE PATENT WET GAS-METERS, Special Meters for Public Lighting, STATION-METERS, Governors, &c.

KING'S ROAD, ST. PANCRAS.

Formerly also (Walter Ford) at Gray's Inn Road.

ANTI-CORRODO TUBES
(BARFF'S RUSTLESS PROCESS)

See Professor FOSTER'S *Article on "The Corrosion of Iron" in* JOURNAL *of March* 30, 1880.

THE RUSTLESS AND GENERAL IRON COMPANY
(JAMES E. AND SAMUEL SPENCER),
Makers of ANTI-CORRODO (BARFF'S) TUBES AND FITTINGS
For Gas, Steam, and Water; also Black Galvanized and Enamelled.

WORKS: West Bromwich. *Quotations and Pamphlet on application to* 97, CANNON STREET, LONDON, E.C. LIVERPOOL OFFICE: 34, Moorfields.

Now ready, Second Edition, price 7s., by post 7s. 3d., the

GAS MANAGER'S HANDBOOK.

By THOMAS NEWBIGGING, M.I.C.E.

Orders to be sent to

WALTER KING,
11, BOLT COURT, FLEET STREET, LONDON, E.C.

BOROUGH OF BELFAST CORPORATION GAS-WORKS.

EXHIBITION OF GAS ENGINES, STOVES, OVENS, BURNERS, AND OTHER APPLIANCES FOR THE ECONOMIC USE OF GAS.

THE Gas Committee of the Belfast Corporation have determined to hold an EXHIBITION as above stated in the Grain Market, Belfast, to commence on the 16th of August, and to continue open until the 28th of August.

Full particulars may be had from the Manager of the Gas-Works, who will also forward to intending Exhibitors form of application for space and copy of conditions under which the Exhibition is to be held.

By order of the Gas Committee,
JAMES STELFOX, Manager.
Gas-Works, Belfast, July 9, 1880.

CAMBRIDGE UNIVERSITY AND TOWN GASLIGHT COMPANY.

TO TAR DISTILLERS AND OTHERS.

THE Directors of this Company will at their meeting on the 29th inst. be prepared to receive TENDERS for the Surplus TAR produced at these Works for a period of One or Two years from November next. Probable make about 140,000 gallons per year.

Sealed tenders, addressed to the Chairman, to be delivered not later than the 27th inst.

Further particulars may be had from
JAMES WEEKS, Manager.
Gas Office, Cambridge, July 1, 1880.

NEW VOLUME OF WEALE'S RUDIMENTARY SERIES.

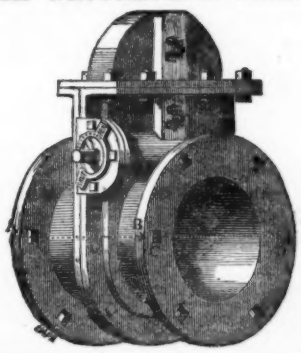
Just Published, 12mo, limp cloth, 4s. 6d., in cloth boards 5s. (postage 4d.),

THE Construction of Gas-Works and the Manufacture and Distribution of Coal Gas. Originally written by Samuel Hughes, C.E. Sixth Edition. Re-written and much Enlarged by WILLIAM RICHARDS, C.E. With numerous Illustrations.

CROSBY LOCKWOOD AND CO., 7, STATIONERS HALL COURT, LONDON, E.C.

WOOD TROUGHING
For Preserving Service-Pipes.
Price from Three-Farthings per Foot.
In any Lengths.
THOS. PROUD,
Brookfield Works, Icknield St., Birmingham.

B. DONKIN & CO.'S
IMPROVED GAS-VALVES
WITH WROUGHT-IRON PINIONS.



These Valves are proved on both sides to 30 lbs. on the square inch before leaving the works, and are kept in stock.

In ordering Valves, please state whether required for under or above ground, and if to be with flanges or spigots and sockets cast on, or with separate spigot and socket pieces.

ALSO MAKERS OF
J. BEALE'S NEW PATENT GAS EXHAUSTERS, STEAM-ENGINES for Driving Gas Exhausters,
VALVES FOR AMMONIACAL LIQUOR, TAR, &c., IMPROVED BRIDGE VALVES for Regulating the Seal in Hydraulic Mains, so arranged that when once adjusted for the proper overflow they can be closed entirely and opened again without altering the adjustment.
GAS THROTTLE-VALVES, SPECIAL GAS-VALVES with Columns, Gauges, &c.
BYE-PASS VALVES, SCREW WATER-VALVES, &c., &c.

B. DONKIN & Co., BERMONDSEY, LONDON, S.E.

THE
LANCASHIRE GAS-METER COMPANY, LIMITED,
FALCON STREET, ASHTON ROAD,
OLDHAM,
MANUFACTURERS OF

WET AND DRY GAS-METERS,
STATION-METERS, GOVERNORS,
LAMP GOVERNORS & TAPS, PRESSURE-GAUGES, MAIN THERMOMETERS,
ETC., ETC.

BRILLIANT WHITE SILENT LIGHT.

WILLIAM SUGG'S
CELEBRATED PATENT GAS-BURNERS,

PREVENTING WASTE AND FLARING.

THE PATENT "CHRISTIANIA" FLAT-FLAME GOVERNOR BURNER,

With Various Pattern Burners and Shades, Plain White and Hand-Painted in Various Styles of Decoration, Fern Leaves, Flowers, Birds, &c.

The "Christiania" Globe.

Mediæval Pattern Burner (Registered).

"Christiania" Globe, Decorated Pattern.

Beaded Pattern Burner (Registered).

All Burners and Glass bear my Trade Mark.

BRONZE MEDAL, PARIS, 1867.

GOLD MEDAL, PARIS, 1878.

BRONZE MEDAL, LONDON, 1862.

DIPLOMA, LONDON, 1871.

THE ONLY MEDAL AWARDED FOR BURNERS, YORK, 1879.

The "Princess Christiania" Globe, Maidenhair Pattern.

Gothic Pattern Burner (Registered).

Beware of Imitations.

The "Princess Christiania" Globe.

Queen Anne Pattern Burner (Registered).

With 5 cubic feet of Gas, the ordinary Fishtail and Bat's-wing Burners give only a light equal to from SIX to EIGHT SPERMACETI CANDLES, while the PATENT "CHRISTIANIA" FLAT-FLAME BURNER, with self-acting Governor, consuming 5 cubic feet of Gas per hour, gives a light equal to SIXTEEN SPERMACETI CANDLES, or ONE HUNDRED PER CENT. more light for the same quantity of Gas consumed.

FOR PARTICULARS, LISTS, PHOTOS, &c., APPLY TO

W. SUGG, Engineer,

GRAND HOTEL BUILDINGS, CHARING CROSS, & VINCENT WORKS, WESTMINSTER.

SAMUEL CUTLER & SONS,

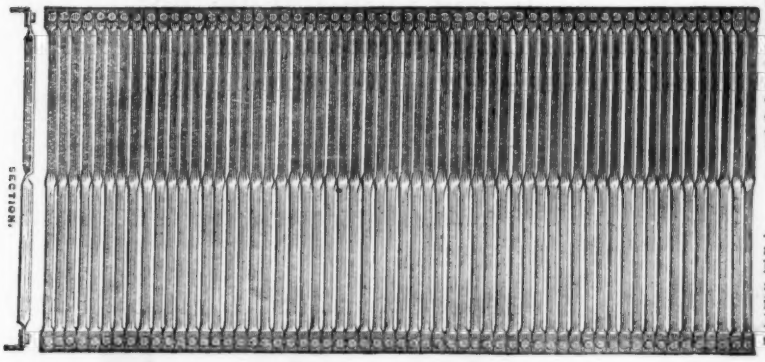
MILLWALL, LONDON, E.,

CONTRACTORS FOR THE

ERECTION OF GAS AND WATER WORKS,

Undertake their ENTIRE ERECTION or EXTENSION in any part of the World, including Small Works for VILLAGES and MANSIONS, as well as of very LARGE EXTENT. Have recently constructed for the PHŒNIX GAS COMPANY the LARGEST GASHOLDER yet erected.

S. C. and SONS supply *every* requisite for Gas-Works, and keep in stock Small Articles, such as BARROWS, SCOOPS, RETORT-LIDS, BOLTS, &c.; and they manufacture WOOD SIEVES of a very superior description.



CUTLER'S PATENT WATER-VALVES

Are the very best possible as PURIFIER VALVES; leakage impossible, most easy to work, never get out of order or the worse for wear, and can, if desired, be very simply arranged to work the whole or a part of a set of Purifiers in any conceivable order whatever. Have already been erected and approved at the London Gas-Works, Nine Elms; Phœnix Gas-Works, Greenwich; Maidstone, Ipswich, &c.

Full Particulars on Application.

CUTLER'S PATENT SIEVES

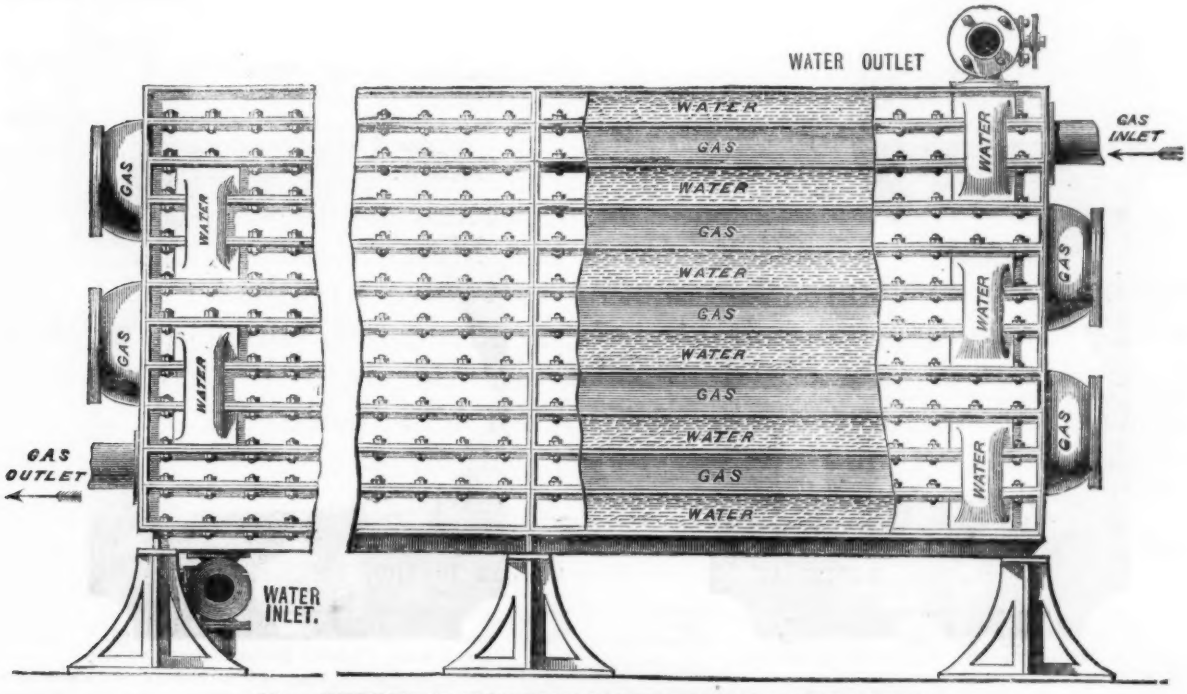
Are the most durable. The sieve bars presenting an inclined plane to the flow of the Gas, offer the least possible resistance, greatly reducing pressure, and permitting contact with every part of the purifying material. Have been supplied to many of the London and Provincial Gas-Works, and give great satisfaction.

Copies of Testimonials on Application.

MORRIS AND CUTLER'S PATENT CONDENSERS

Adopt water as a cooling medium, the respective streams flowing in opposite directions; quantity of water required but small, and being only raised in temperature, is useful for any purpose of the works. The power of Condensers can be regulated at will by the amount of water permitted to pass through. Erected and giving great satisfaction at Brentford, Tunbridge Wells, Maidstone, Buxton, Phœnix Gas-Works, Greenwich; where its advantages may be seen.

Mr. WATES, of Greenwich, has kindly offered to reply to any inquiries addressed to him as to its efficiency.



Also CUTLER'S PATENT MOUTHPIECE SUPPORTS,

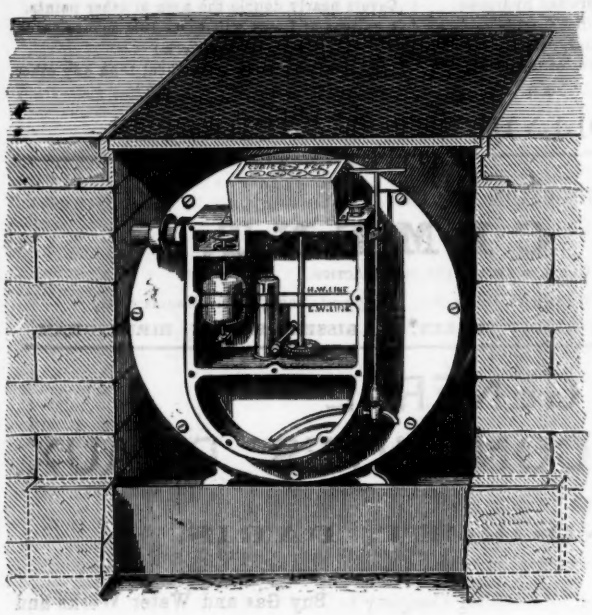
AND

CUTLER'S PATENT REMOVABLE DIPS.

[*See* JOURNAL for Nov. 25, 1879.]

IMPROVED STREET LIGHTING.

The necessity for having large sized Gas-Lights at street crossings and other open spaces is now generally recognized. To facilitate terms for their use between Gas Companies and Lighting Authorities, we have devised a simple meter arrangement as shown.



The index faces upwards.

The inlet at side and outlet at back may be altered as desired.

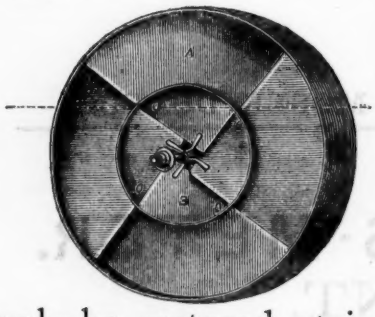
The rod with handle opens and closes the overflow tap.

The Meter case is of cast iron, and it is desirable to place it on a support 6 in. or 8 in. from bottom of tank, that it may be free from the effects of damp.

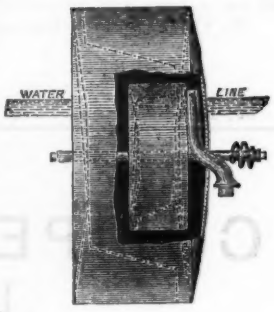
In frosty weather a little glycerine mixed with the water prevents freezing.

The Meter is fitted with

WARNER & COWAN'S
PATENT SELF-REGULATING DRUM,



which ensures correctness of registration within the water-lines shown on the illustration, while its long range of float prevents the valve being closed by vibration from traffic.



Frequent inspection is unnecessary, as the Meter need only be watered at intervals of nine to twelve months.

Dry Meters are unsuitable—the condensation which takes place inside Meters in so exposed a position interfering with their working.

Our arrangement has been in use for some time in several of the London parishes, and gives complete satisfaction.

They are made in all sizes up to 20 Lights.

PRICES AND DIMENSIONS ON APPLICATION TO

W. & B. COWAN,

(ESTABLISHED 1827),

DRY & WET GAS-METER MANUFACTURERS,

CHURCH ST., MILLBANK ST., **LONDON. S.W.** | DUTTON ST., NEW BRIDGE ST., **MANCHESTER.** | BUCCLEUCH ST. WORKS, **EDINBURGH.**

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

J. E. WILLIAMS & CO.,

SOLE MANUFACTURERS OF THE

SPECIAL METALLIC OXIDE PAINT,

Largely used by Gas Companies, Corporations, Railway Companies, Ironfounders, and Machinists.

HONOURABLE MENTION.

PARIS EXHIBITION, 1878.

It has the following qualifications and properties:—

Effectually prevents and arrests corrosion.
Has a fine gloss, and is very durable.
Does not require driers like other paints.
Protects iron from action of water.

Is not affected by sulphuretted hydrogen.
Forms a very hard, tough (not brittle) surface.
Will not crack, blister, or scale.
Is not affected by extremes of temperature.

Covers nearly double the area of other paints. (7 gallons or 1 cwt. will cover 1211 square yards of ironwork.)
Is cheaper and more economical than any other.

VICTORIA PAINT WORKS, COLLYHURST, MANCHESTER.

ECONOMY IN THE PRODUCTION OF GAS.

PLUTONIC CEMENT,

FOR JOINTING AND REPAIRING RETORTS AND OVENS *in* ACTION AND *out* OF ACTION.

Pamphlet on the advantages of the above, with Modes of Application, References, Prices, &c., free by post, from the Sole Manufacturer,

WILLIAM RICHARDSON, Gas and Hydraulic Engineer, CHARLES HENRY STREET, and BISSELL STREET, BIRMINGHAM.

COMPTOIR GÉNÉRAL D'USINES À GAZ ET CONDUITES D'EAUX.

Offices: 55, RUE CONDORCET, PARIS.

The Comptoir Général of Gas and Water Works is authorized by a leading Company to **Buy Gas and Water Works and Concessions.**

The Comptoir Général is established for the **Buying and Selling of Works and Concessions.**

The Comptoir Général guarantees Capital for *bonâ fide* Undertakings.

The Comptoir Général undertakes the **Formation of Companies in France.**

The Comptoir Général undertakes the **Formation of Companies in England.**

M. L. MOSER DULFUS, the Proprietor of the **Comptoir Général,** has had Twenty years experience in financial affairs, and has a large and influential connection in England, France, and on the Continent.

No Commission or Expenses whatever are charged unless success is secured.

Le Directeur-Gérant,

55, Rue Condorcet, Paris. BN. L. MOSER DULFUS.

IMPROVED COMPENSATING GAS-METER.

HUNT'S PATENT.

This Meter supplies a want long felt, by putting an end to the loss sustained by Gas Companies through the overworking of their Meters.

These Meters can now be supplied in either TIN-PLATE or CAST-IRON CASES, and OLD METERS converted to this plan. GAS COMPANIES and CORPORATIONS will find it to THEIR ADVANTAGE to adopt these Meters.

EXTRACTS FROM REPORTS.

"I am able to report that the Meters have given in each test most satisfactory results."—*Mr. H. Sporne, City of London Meter Inspector.*

"I consider the arrangement is a great improvement upon the Meters in present general use."—*Mr. T. Jackson, Meter Inspector, Birmingham.*

"I would observe from the results of my testings that the Meters are a great improvement on the ordinary Wet Meters in general use."—*Mr. H. Airey, Meter Inspector to the Metropolitan Board of Works.*

COPIES OF REPORTS SENT ON APPLICATION.

MANUFACTURED BY

JOHN BENT & SON,

WET AND DRY GAS-METER AND GAS APPARATUS MANUFACTURERS,

BELL BARN ROAD, BIRMINGHAM.

Established 1830.

BRAY'S

PATENT LANTERN AND FLAT-FLAME BURNERS.

80-CANDLES POWER. Scale 1 inch to foot.
To be Lighted by ordinary Torch, or one Flash Jet.
Arrows show direction of regulated Column of Air.

The understated declaration with which we introduced our apparatus has been fully borne out by general experience—namely, that

"THE FLAT-FLAME IS THE ONLY PRACTICABLE SYSTEM FOR STREET LIGHTING; and, 'in actual use,' yields as much light with Common Gas, and more with Cannel Gas, than any Argand System."

BIRMINGHAM LAMP TESTS

AFTER the most exhaustive series of experiments, extending over more than twelve months, with the most extensive assortment of Burners and Lanterns of large lighting power ever brought together, the Birmingham Authorities have

ADOPTED BRAY'S SYSTEM

for their Street-Lighting Improvements, for which purpose Sixty-Five 100-candle power Lanterns of medium lighting power are immediately required.

The apparatus used in the above tests were all of our usual medium lighting power class, and the tests showed that we sacrifice a considerable amount of lighting power for the sake of general efficiency. The tests further showed that our 80*-candle* HIGHEST *lighting power burner yielded* 3·51 *candles per foot of gas (the quality being* 16·75—3·35 *per foot—by the standard), which was a higher result than that yielded by any other flat-flame burner, and higher than the* 80*-candle power Argands.*

NOTE.—The above is the most conclusive answer to certain misleading statements which are being made by a prominent defeated competitor.

Extract from the *Leeds Mercury*, April 1, 1880.

At the meeting of the Leeds Town Council, March 31, Alderman Gaunt moved that the Council approve of the acceptance by the Corporate Property Committee of the tender of Messrs. Geo. Bray and Co. for the supply of 21 new lamps, to be placed upon the pillars round the Town Hall. The Committee had tested Sugg's and other lamps, and found Messrs. Bray's the best. It was intended to have two 200-candles power and two 100-candles power, and 17 round the hall of 80-candles power. Mr. Lynd, in seconding the motion, said that he had had an opportunity of seeing different lamps tested at Birmingham, and he was in favour of Messrs. Bray's.

Extract from the *Daily Free Press*, Aberdeen, Jan. 1, 1880.

Judging of the merits of the lights as they appeared last night, on-lookers seemed to be generally of opinion that between Sugg's patent and Bray's larger light at the corner of Union Buildings, Castle Street, there was no perceptible difference in the illuminating power. When the vital question of gas consumption is taken into account, it is found that in the Castle Street lamps there is a marked difference in the quantity of gas consumed, for while 30 feet of gas are hourly burned in Sugg's Patent Lamp, only 20 feet are used by Bray's Lamp during the same period.

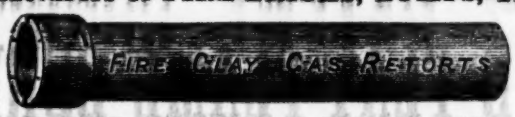
[The above Lamps have Meters attached.]

Bray's Lanterns have been adopted by the Vestry of St. George, Hanover Square, London, for all the crossings and refuges of that important district, after a direct competition with the Argand system of lighting; and also by about 50 Towns and Vestries, after a similar competition in most cases.

GEORGE BRAY & CO., BLACKMAN LANE, LEEDS.

JOHN HALL AND CO., STOURBRIDGE,

Manufacturers of FIRE-BRICKS, LUMPS, TILES,



AND EVERY DESCRIPTION OF FIRE-CLAY GOODS.

N.B.—A Stock of 15 and 16 in. CIRCULAR RETORTS always on hand. Other kinds made to order on short Notice.

LONDONDERRY GAS COALS

DIRECT FROM THE

MARQUESS OF LONDONDERRY'S COLLIERIES.

COUNTY OF DURHAM.

For Prices and Particulars, apply to

MR. S. J. DITCHFIELD,

LONDONDERRY OFFICES, SEAHAM HARBOUR, COUNTY OF DURHAM.

London Agents: Messrs. LAMBERT BROS., 85, GRACECHURCH ST., E.C.

J. & H. ROBUS,

BUILDERS AND CONTRACTORS

FOR THE ERECTION AND REBUILDING OF GAS AND WATER WORKS,

RETORT-SETTING—A SPÉCIALITÉ.

ROBUS'S IMPROVED RETORT-SETTINGS, guaranteed to Carbonize a large amount of Coal with a small per cent. of Fuel.

ESTIMATES GIVEN FOR MAIN-LAYING.

N.B.—All kinds of Fire Goods and Gas Apparatus supplied on the shortest notice.

Address:—J. & H. ROBUS, BELL GREEN, CATFORD, LONDON, S.E.

THE

THAMES BANK IRON COMPANY,

UPPER GROUND STREET, LONDON, S.E.,

SUPPLY FROM STOCK

CAST-IRON RETORTS AND ALL KINDS OF GAS-WORKS APPARATUS,

SOCKET-PIPES FOR GAS OR WATER PURPOSES,

FLANGE-PIPES FOR STEAM,

RAIN-WATER PIPES AND GUTTERS,

HOT-WATER BOILERS, PIPES, AND CONNECTIONS,

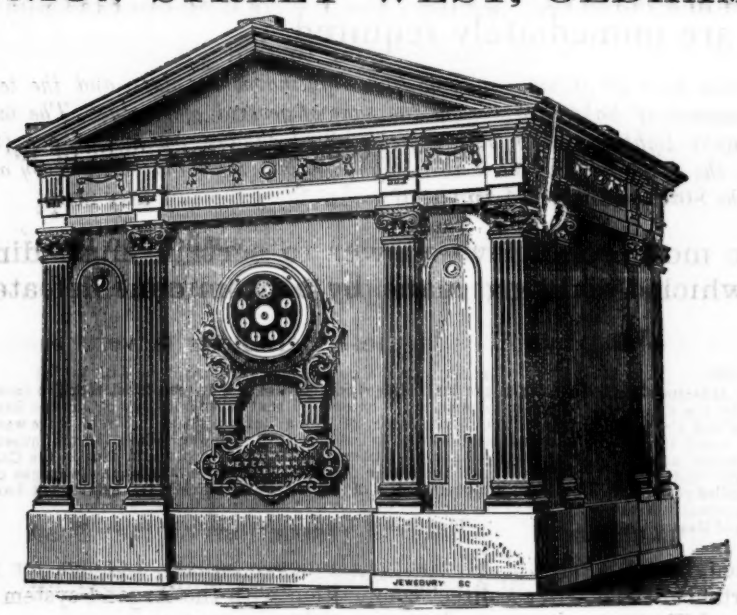
LAMP-COLUMNS, LAMPS, LAMP-FRAMES, WROUGHT TUBES, &c.,

HOT WATER AND HOT AIR APPARATUS,

Erected complete on the most Improved Principles.

GEORGE NEWTON,

UNION STREET WEST, OLDHAM,



MANUFACTURER OF

SQUARE STATION-METERS, with PLANED JOINTS;

ROUND STATION-METERS, WITH CAST-IRON STANDS;

WET AND DRY CONSUMERS GAS-METERS, GOVERNORS, &c.

OXIDE OF IRON.

Gas Companies can be supplied with any quantity of Natural Oxide suitable for Gas Purification purposes. Shipped direct from the extensive estates in Co. Donegal of the Earl of Leitrim and Wybrants Olphert, Esq., D.L.

By thus purchasing from the producer a constant supply of the purest material will be assured to the Gas-Works, and intermediate profits will be saved to the Shareholders.

For terms, references, and particulars apply to

JOHN BEATTIE,

FALCARAGH, Co. DONEGAL, IRELAND.

W. C. HOLMES & Co.,

ENGINEERS AND CONTRACTORS

FOR

GAS AND WATER-WORKS,

WHITESTONE IRON-WORKS,

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REFERENCES TO UPWARDS OF 400 WORKS.

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CAST-IRON PIPES

FOR

GAS, WATER, & STEAM.

LISTER HILLS FOUNDRY,

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IMPORTANT to GAS COMPANIES.

MESSRS. JOHN ABBOT & CO., LIMITED,

OF SUFFOLK LANE, LONDON, AND GATESHEAD,

Manufacture and Erect

SULPHATE PLANT

On the most Modern and Improved Plan.

EXAMPLES

Can now be seen at

NEWCASTLE, CARLISLE,

And will shortly be erected at the New Gas-Works,

TUNBRIDGE WELLS.

GAS AND WATER PIPES.

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CAST-IRON GAS AND WATER PIPES.

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Prices on application.

H. & C. DAVIS & CO.'S

Illustrated Catalogue sent Free.

FAMILY GAS KITCHENERS,
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BREAKFAST GRILLERS, &c.
GAS BATHS,
CIRCULATING GAS BOILERS,
ASBESTOS FIRES, AND
CHEERFUL HEATING STOVES.

286, 288, & 290, CAMBERWELL ROAD,

LONDON, S.E.

THE MANN & WALKERS' PATENT SCRUBBER.

Extensive use.

The successful and extensive use of the Mann and Walkers' Patent Scrubbers in all parts of the world has demonstrated their advantages, and entitled them to be received with credit and confidence. The number of them in use is about twenty times that of any other known means of purifying gas from ammonia.

Small quantity of Water required.

By a very small quantity of clean water (not more than 5 or 6 gallons per ton of coals carbonized) the whole of the Ammonia contained in the Gas is completely absorbed; the Gas, after only once passing through, issuing from the Scrubber outlet completely purified from Ammonia. The Scrubber gives no appreciable back pressure.

Residual Product obtained.

The Residual Product—namely, the Ammoniacal Liquor—is obtained at from 20 to 30 ounces commercial strength, which enables it, after being mixed with the weaker Liquor from the hydraulic main and condensers, to be sold to the Manufacturing Chemists, or converted into Sulphate, at the degree of strength found most profitable to the Gas Company.

Illuminating power increased.

The Scrubber is a Saturator, and the Gas being soaked in this strong solution of Ammonia in the lower columns of the Scrubber, is purified from a large amount of Carbonic Acid, and its Illuminating Power is thereby increased.

Small amount of power required.

The friction is so little, and the motion so slow, that the power necessary to work the Scrubber is almost inappreciable. A small gas-engine will work a pair of Scrubbers, purifying 2 million cubic feet of gas per day.

Beckton Gas-Works.

There are thirty of these Patent Scrubbers in the Beckton Gas-Works, equal to purifying 30 million cubic feet per day, and the total amount of engine power necessary to work the whole 30 is not equal to that given out by one 10-horse engine.

Reserve purifying power contained.

There is also a most important advantage arising from the height of these Scrubbers, in the reserve force contained in them. In the event of any stoppage, the mass of soaked and wetted material would continue the purification for hours, even if the supply of water and working were stopped from any cause.

Internal Materials not changed.

The changing of the soaking materials in these Scrubbers is very seldom required; they are well known to remain in action for seven years without being emptied.

Guarantee

They are in all cases erected under guarantees; they easily fulfil the stipulations of any Act of Parliament, and the chemical restrictions of the Board of Trade; and in cost they are much less to a Gas Company than any other known means of purifying Gas from Ammonia.

C. & W. WALKER.

8, *Finsbury Circus, London, E.C.*

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MANUFACTORY AND SHOW-ROOMS:

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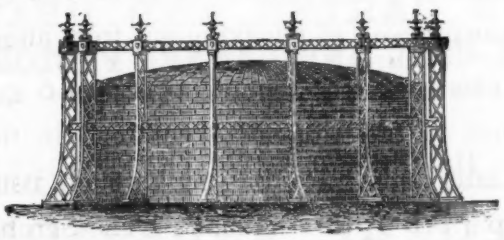
ESTABLISHED 1807.

MANUFACTURERS OF CRYSTAL GLASS CHANDELIERS,

WALL LIGHTS, AND LUSTRES FOR GAS AND CANDLES.

TABLE GLASS OF ALL KINDS.

CHANDELIERS IN BRONZE AND ORMOLU. MODERATOR LAMPS.



THE HORSELEY COMPANY,

LIMITED,

TIPTON, STAFFORDSHIRE.

LONDON OFFICE:

6, WESTMINSTER CHAMBERS, VICTORIA STREET,

GAS ENGINEERS, IRONFOUNDERS, &c.,

MANUFACTURERS OF

GASHOLDERS, WROUGHT AND CAST IRON TANKS, CONDENSERS, PURIFIERS, SCRUBBERS, MAINS, RETORT-LIDS, PLAIN AND DISHED, LAMP-POSTS, PIPES,

AND ALL REQUISITES FOR EITHER

GAS OR WATER WORKS;

ALSO

MAKERS OF ROOFS, BRIDGES, &c.

S. OWENS & CO.,

WHITEFRIARS STREET, LONDON, E.C.,

HYDRAULIC ENGINEERS,

AND MANUFACTURERS OF

PUMPING MACHINERY of every Description.

SOLE LICENSEES AND MANUFACTURERS FOR GREAT BRITAIN OF

BLAKE'S PATENT STEAM-PUMPS,

More than 10,000 in use,

ESPECIALLY ADAPTED FOR USE IN GAS AND CHEMICAL WORKS, FOR PUMPING TAR, WATER, AMMONIACAL LIQUOR, ACIDS, &c.

The following are some of the prominent advantages of the BLAKE PUMP:—

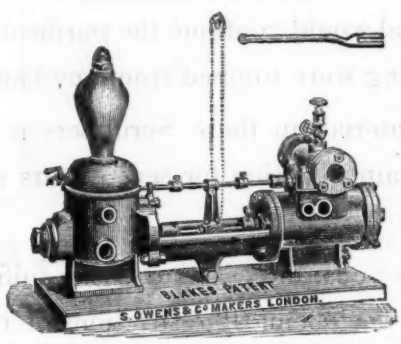
It will start at any point of stroke.

It has no dead point.

It works fast or slow, with the same certainty of action.

It is economical. Has a lead on the slide-valve.

It is compact and durable.



It is interchangeable in all its working parts.

It will deliver more water than any other pump.

It is made of best materials in the most workmanlike manner.

Can be worked at 20 strokes per hour, or 200 strokes per minute.

This Illustration represents Boiler-Feed Pumps, Sizes Nos. 1, 2, and 3, with Hand Lever for working Pump when Steam is not available.

SOLE MANUFACTURERS OF

MANN & OWENS

IMPROVED PATENT GAS-VALVES.

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HENRY LYON,

MECHANICAL AND CONSULTING GAS ENGINEER

NORWOOD, NORTHENDEN ROAD,

SALE, NEAR MANCHESTER.

ALFRED LASS, F.I.Accts.,

SPECIAL ACCOUNTANT FOR GAS AND WATER UNDERTAKINGS,

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Accounts Analyzed and Statistics Prepared for Parliamentary Proceedings, Arbitrations, &c.

The Forms of Account, which have been specially designed by Mr. Lass to meet the requirements of the Gas-Works Clauses Amendment Act, 1871, are now in use by many Gas Companies, Corporations, and Local Boards.

JOHN ROMANS, C.E., F.G.S.E.,

CONSULTING GAS ENGINEER

AND

CANNEL COAL FACTOR,

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Plans and Estimates furnished; Gas-Works, Apparatus, Pipes, Machinery, Fire Goods, &c., supplied, or Attested and Shipped for Exportation.

GAS-WORKS TAKEN ON LEASE.

Mr. ROMANS has for upwards of 30 years been practically engaged in the Manufacture of Gas, and has, by extensive experiments, ascertained that by JUDICIOUS INTERMIXTURE of the lighter with the heavier gases, much of the rich Hydrocarbons CAN BE SAVED, which otherwise ARE LOST, during the process of manufacture. He is therefore enabled to give advice to those who favour him with their orders for Cannel, as to the class which will secure for their standard of illuminating power the HIGHEST ADVANTAGEOUS RESULTS.

ANALYSIS AND PRICES FORWARDED ON APPLICATION.

THOMAS PROUD,

BROOKFIELD WORKS,

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MANUFACTURER OF

WOOD GRIDS

FOR

PURIFIERS AND SCRUBBERS,

AND

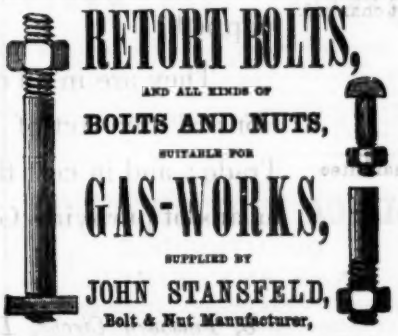
GENERAL STEEL AND IRON TOOLS AND MATERIAL USED IN GAS-WORKS.

BOX'S PATENT STREET GAS-LAMP

Has the following good qualities:—

1. No putty or other material is required for glazing. Thus there is no hacking out of old putty on removal of the glass, with the *consequent damage* to the lamp frames. 2. No liability to breakage by unequal expansion of the glass caused by changes of temperature. 3. Any inexperienced workman can glaze the lamp in a few minutes. 4. The system of glazing can be applied to any existing lamp at a trifling cost. 5. It is cheap, strong, and durable. 6. The glass can be easily removed so that the frames can be thoroughly painted inside and out.

The lamp may be supplied fitted with clear opal or ribbed glass, *as also with enamel tops* if required. The necessary fittings for altering existing lamps to this system can be supplied at moderate prices and a small charge for royalty. Licences granted on the most reasonable terms. For further particulars apply to the Patentee, W. W. BOX, Gas-Works, Crayford, Kent.



RETORT BOLTS,

AND ALL KINDS OF

BOLTS AND NUTS,

SUITABLE FOR

GAS-WORKS,

SUPPLIED BY

JOHN STANSFELD,

Bolt & Nut Manufacturer,

ALFRED ST., BOAR LANE, LEEDS.

ROBERT MARSHALL,

CANNEL COAL MERCHANT,

198, ST. VINCENT STREET, GLASGOW.

SHOTT'S BOGHEAD.

HARTHILL CANNEL

Yields 14,220 cubic feet of 40·92-candle gas per ton.

THRASHBUSH CANNEL

12,550 cubic feet of 40·22-candle gas per ton, and 9 cwts. of good coke.

LOTHIAN'S CANNEL

Yields 12,500 cubic feet of 34-candle gas per ton, and 9 cwts. of excellent coke, containing only 4 per cent. of ash.

MUIRKIRK, No. 1, CANNEL

Yields 12,160 cubic feet of 32·5-candle gas per ton, and 10 cwts. of excellent coke, containing only 5 per cent. of ash. This cannel is almost free from sulphur.

OLD WEMYSS CANNEL

Yields 13,320 cubic feet of 33·5-candle gas per ton.

Prices and full analyses on application at above address, or from WEDDERBURN, FERGUSON AND CO., 91, Lime Street, LONDON, E.C.

HEBBURN MAIN GAS COAL.

This Coal is now highly approved of for gas making, and yields over 10,000 feet per ton of 15-candle gas, and about 14 cwt. coke.

For references and prices, either f. o. b. or by rail, apply to

W. RICHARDSON,

29, QUAYSIDE, NEWCASTLE-ON-TYNE.

WANTED, by Samuel Thompson & Co., Colliery Office, Lancaster, APPLICATION for PRICES from Gas Managers who are prepared to receive Tenders for GAS COAL or CANNEL.

John Leigh, Esq., M.R.C.S., F.C.S., &c., &c., in his analytical report of S. T. & Co.'s Coal, says: "It is remarkable for its purity. I have scarcely ever examined a Coal containing so small a quantity of ash and when Cannel of the best description is scarce, it may well replace this material."

GAS COAL.

POPE & PEARSON, LIMITED, have now the authority of several of the most eminent Gas Engineers of London in stating that their Coal yields *in practical working over 16,000 cubic feet of gas, with an illuminating power of 16 candles;* or by the standard burners now used by the London Gas Companies, an illuminating power equal to 17¼ candles.

One ton yields 12½ cwt. of good coke. This Coal can be shipped from Hull, Goole, Liverpool, Morecambe, and Barrow.

For further particulars, apply to POPE AND PEARSON, LIMITED, West Riding and Silkstone Collieries, near LEEDS.

GAS COAL.

THE MIRFIELD COAL COMPANY are supplying GAS COAL of the best quality on trucks at their siding. This Coal contains 10 per cent. of Cannel, and, as analysed by Mr. James Paterson, of Warrington, yields 12,500 *cubic feet of 16·67-candle gas, with 1430 lbs. of good Coke, per ton.* Ash in Coke, 1·58.

Apply to the MIRFIELD COLLIERY, Mirfield, NORMANTON. London Agent: Mr. F. J. LEE SMITH, 34 THROGMORTON ST.

GAS COAL.

THE Tawd Vale Colliery Company, Limited, are prepared to Contract for the Supply of their superior Arley and other GAS COALS, and to send samples to the order of Gas Engineers and others, or complete Analysis, on application. Shipped at Liverpool, Preston, Fleetwood, Garston, or Birkenhead.

Mr. James Paterson, C.E., F.G.S., in his analysis of T. V. Arley Coal, says: "Some parts merge into a semi-Cannel; gas per ton, 10,300 cubic feet; illuminating power, 16·96 candles; coke of high quality, 1431 lbs. per ton."

Collieries, Skelmersdale, near Ormskirk; Offices, 5, New Hall, Old Hall Street, LIVERPOOL.

BIRTLEY IRON WORKS,

CHESTER-LE-STREET,

DURHAM.

Manufactory for every description of Casting and Machinery for Gas-Works and Water-Works.

Warehouse in London for Cast-Iron Pipes and Connexions of all sizes and in any quantity, Scott's Wharf, Bankside, Southwark.

Agent in London, Mr. J. MANWARING, 161 Cannon Street, E.C.

THE

SILICA FIRE-BRICK CO.,

OUGHTIBRIDGE

Near SHEFFIELD,

Manufacturers of THE ORIGINAL SILICA OR DINAS FIRE-BRICKS. Specially adapted for Gas-Retort Furnaces and for Siemens's Gas-Furnaces. Shipments promptly executed to London, Liverpool, Hull, Grimsby, &c.

FERRAND DAVIES,

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AGENT FOR

THOMAS BARR'S LESMAHAGOW MAIN CANNEL,

AND

NEWTON, CHAMBERS, & CO.'S SILKSTONE GAS COALS.

Analyses and Quotations on application.

WILSON CARTER AND PEARSON,

GAS COAL AND CANNEL FACTORS,

Supply to any Railway Station or for Export all kinds of Fuel for Gas purposes.

Address—CHIEF OFFICES.

TEMPLE BUILDINGS, 50, NEW STREET, BIRMINGHAM.

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GAS AND CONSULTING ENGINEER,

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WESTMINSTER, S.W.,

PATENTEE and MANUFACTURER of the following Inventions:—

RETORT SETTINGS—giving great Economy of Fuel.

STEAM-ENGINES and EXHAUSTERS, FOUR-WAY VALVES, WASHERS, SCRUBBERS.

FUEL-MACHINE, for Compressing Breeze and Tar.

N.B.—Pamphlet, with Twenty-Eight Illustrations and Letterpress, on the Construction of Gas-Works, will be sent, post free, on receipt of 4s. in stamps To be had of the AUTHOR; or at the Office of the "JOURNAL OF GAS LIGHTING."

PRICES AND ALL PARTICULARS TO BE HAD OF THE PATENTEE,

85a, GREAT GEORGE STREET, WESTMINSTER, S.W.

KÖRTING'S STEAM-JET EXHAUSTER,

IMPROVED CLELAND'S PATENT.

UPWARDS OF 400 IN USE.

CLELAND'S PATENT SLOW-SPEED CONDENSER, AND CLELAND'S PATENT STEAM SCRUBBER.

FOR PARTICULARS, APPLY TO

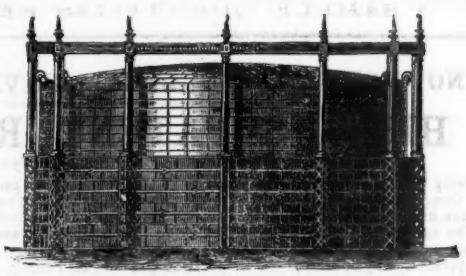
KÖRTING BROS.,

17, LANCASTER AVENUE, MANCHESTER,

OR TO

GERALD J. TUPP, Creek Engine-Works,

Middle Mall, Hammersmith, London, W.



HENRY BALFOUR & CO.,

ENGINEERS, IRONFOUNDERS, AND GAS APPARATUS MAKERS,

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Works: DURIE FOUNDRY, LEVEN, FIFE, N.B.

MANUFACTURERS OF

GASHOLDERS, SINGLE OR TELESCOPE, WITH OR WITHOUT COUNTERBALANCE GEAR; TANKS, CAST & WROUGHT IRON.

BOILERS, CONDENSERS, CRANES, EXHAUSTERS AND ENGINES,

GIRDERS (Cast and Wrought Iron), IRON PIPES, PUMPS, PURIFIERS, RETORTS & FITTINGS,

ROOFS, SCRUBBERS, SHAFTING, VALVES, WASHERS.

ANDERSON'S PATENTED INVENTIONS, VIZ.—

FOUR-WAY BYE-PASS VALVES, ENGINES AND EXHAUSTERS, REVOLVING BRUSH SCRUBBERS, GAS-WASHERS, FUEL-MAKING MACHINES, GOVERNORS, &c.

H. B. & Co. undertake Contracts for the Supply and Erection of Gas-Works, either for Towns or Mansions, or the Remodelling of existing Works.

SHIPPING ORDERS receive special attention.

H. B. & Co. having had large experience in this Department, undertake to ship, f.o.b., properly packed and marked for export.

ESTIMATES AND DESIGNS ON APPLICATION.

ALDWARKE MAIN AND CAR HOUSE COLLIERIES,

Near ROTHERHAM.

JOHN BROWN & CO., LIMITED,

ATLAS STEEL AND IRON WORKS, SHEFFIELD.

PROPRIETORS.

The Aldwarke Main Brights is a first-class gas-making and coking Coal, yielding by analysis 12,600 feet of 19-candle gas per ton, and giving "Weight of illuminating matter in lbs. of sperm, 820·80." It is very free from impurities and foreign matter.

Copies of Analyses made by Gas Companies who have used it will be forwarded and Samples sent on application.

THE LOCHORE & CAPLEDRAE CANNEL COAL COMPANY,

Limited,

Beg to intimate that the development of their Mines is progressing favourably, and that they are now in a position to supply their famous Cannels.

Quotations and full Analyses will be supplied on application addressed to the Company,

LOCHGELLY, FIFESHIRE, N.B.

Abstract of Analyses made by Dr. WALLACE, Gas Analyst for the City of Glasgow.

	Cubic Feet per Ton.		Illuminating Power.		Equivalent of a Ton in Sperm.
Plesio Roghead	13,165	....	36·16	....	1632
Brown Capledrae	12,210	....	38·46	....	1610

GAS COAL. GAS COAL. GAS COAL.

WELLS, BIRCH, RYDE, and CO., Limited,

HOYLAND SILKSTONE COLLIERIES,

Near BARNSLEY.

This Company is now in a position to raise 2000 tons per day of REAL OLD SILKSTONE GAS COAL.

"The quality of this Coal for Gas purposes, if equalled, is not excelled by any on record, and the Coke competes successfully with best Durham."—See *Mining Journal*, Aug. 11, 1877.

Prices quoted to any Railway Station, or F.O.B. Hull, Grimsby, Goole, Keadby, Liverpool, and Fleetwood.

Full particulars will be sent on application to above address.

THE WIGAN COAL & IRON COMPANY,

LIMITED.

MIDLAND DISTRICT OFFICE: 97, NEW STREET, BIRMINGHAM; AGENT: A. C. SCRIVENER,

Supply the Best Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, &c.

N.B.—The Wigan Coal and Iron Company, Limited, are exclusive owners of the well-known HAIGH HALL AND KIRKLESS HALL GAS COAL COLLIERIES.

THE BLAINSCOUGH HALL COLLIERY COMPANY.

BEST WIGAN ARLEY GAS COAL.

Yielding (as per analysis) 11,970 cubic feet of 16·39 candle gas per ton. Copies of analyses and testimonials from Gas Companies and Managers, who have used the Coal in large quantities for several years, will be forwarded on application.

Postal address, CHORLEY, Lancashire.

Waggon address, COPPULL SIDING, near WIGAN, London and North-Western Railway.

SAMPLE QUANTITIES SENT ON APPLICATION.

NO MORE WASTE LIME! SAVE THE VALUABLE PRODUCT!

G. R. HISLOP'S PATENT REGENERATIVE PROCESS

Most Effectively and Economically restores this waste *ad infinitum*.

The Patentee having devoted more time and attention to this subject than perhaps any other person living, is now in a position to recommend the adoption of this process to Gas Companies and Corporations with the utmost confidence in its practical utility, convenience, and economy. 1st. It restores the spent Lime at from one-third to one-half its original cost, apart from its undoubted convenience and the economy of space. 2nd. There is practically no limit to the duration of the Lime. 3rd. The cost of apparatus for the introduction of the process is very moderate and exceedingly durable. 4. The Patentee supplies special bricks and castings, erects and proves the process on the most favourable terms.

The process, in operation, may be seen at the Corporation Gas-Works, Paisley, where the Lime has been restored 120 times. Inspection is cordially invited.

For Terms, apply to GEO. R. HISLOP, F.C.S., Engineer, Gas-Works, PAISLEY, N.B.

LIVESEY FIRE-CLAY WORKS.

NEAR BLACKBURN, LANCASHIRE.

(ESTABLISHED 1835.)

ORLANDO BROTHERS, LIMITED,

MANUFACTURERS OF PATENT CLAY RETORTS,

AND EVERY DESCRIPTION OF

TUBULAR GLAZED SEWERAGE PIPES, BENDS, JUNCTIONS, ETC.

FIRE-BRICKS, TILES BLOCKS, AND CHIMNEY-TOPS.

CROLL'S
DRY GAS-METERS,

PRIZE MEDALS. (INVENTED & PATENTED IN 1844,) PRIZE MEDALS.

LONDON, 1851; NEW YORK, 1853; PARIS, 1855. COMBINING ALL THE LATEST IMPROVEMENTS, LONDON, 1862; DUBLIN, 1865 PARIS, 1867.

MANUFACTURED ONLY BY

THE GAS-METER COMPANY, LIMITED,

238, KINGSLAND ROAD, LONDON, N.E.

SOLE AGENT FOR SCOTLAND: JAMES KEITH, EDINBURGH AND ARBROATH.

CIRCULAR TO GAS COMPANIES AND OTHERS.

Stourbridge, Jan., 1880.

DEAR SIRS,—As the time for ordering stock for your general requirements for this year is approaching, we beg to call your attention to the various articles of our manufacture, and to solicit your early commands.

Fire-Clay Gas-Retorts.—As some of our friends appear to prefer these *machine made*, we have arranged to supply machine-made Retorts at same price as hand-made ones. At the same time, although it is to our advantage to supply machine-made, we do not recommend them, for the reason stated to you in our Circular of November, 1878. We have a very large stock of Retorts, all in good condition, and of such an assortment that we could supply any size on receipt of order.

Fire-Bricks and Fire-Clay Settings of all Shapes and Sizes.—We have a large and varied stock, or could make to special design at short notice.

Staffordshire Blue Bricks and Paving Bricks.—We shall be glad to submit prices and samples of these on hearing from you, with specification, and we venture to say our brand in these goods is unsurpassed. Hard Blue Paving Quarries make the best kind of Pavement for Retort-Houses, &c.

Coloured and White Glazed Bricks, Porcelain Baths, Kitchen Sinks, Corner Sinks, &c., we are making a great speciality of, and have no hesitation in saying that our glazed goods are unequalled for soundness of manufacture and purity of colour.

Earthenware Drain-Pipes, Cast-Iron Pipes, Wrought-Iron Tubing.—We should be glad of an opportunity of quoting you for these when you are in the market.

Lime, Cement, Plaster of Paris.—Our Lime Kilns at Brettell Lane are now in full operation, and we are in a position to supply any quantity of pure Lime manufactured only from the Earl of Dudley's best Limestone Beds. Our Cements and Plaster of Paris will withstand any required test.

References and Testimonials.—We can furnish you with any number of these; and may mention that during the last thirty-five years we supplied most of the Gas-Works in the United Kingdom and Abroad, and that we have held contracts from Her Majesty's Government for more than Twenty years consecutively.

Awaiting your esteemed favours,

We remain, Dear Sirs, your obedient servants,

HARRIS & PEARSON.

Note.—We shall be pleased to furnish Drawings and Specifications, if desired, and shall be most happy to see you or any of your Engineers here at any time; or, if you would like to see any of our representatives or ourselves at your Works, shall be glad to wait upon you by appointment.

R. LAIDLAW AND SON,

EDINBURGH AND GLASGOW,

SOLE MAKERS OF

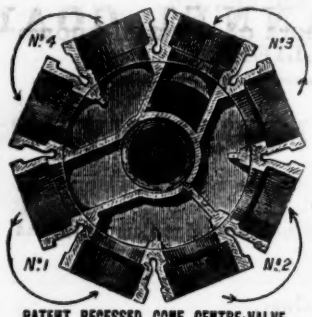
PATENT

RECESSED CONE CENTRE-VALVES,

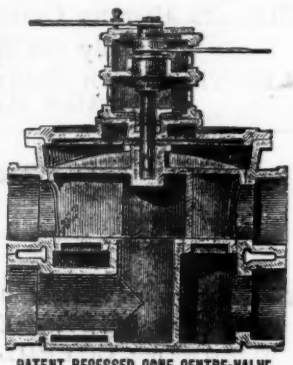
Constructed on the principle of the ordinary Plug-Cock.

THROUGH-WAY & FOUR-WAY COCKS

Of all descriptions.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Plan.



PATENT RECESSED CONE CENTRE-VALVE.
Sectional Elevation.

London Office: 6, LITTLE BUSH LANE, CANNON STREET.

D. HULETT & CO.

Invite the attention of Gas Companies, Corporations, and others to their

PATENT STREET LAMPS,

Which are so constructed that neither putty nor other materials are required to secure the glass. No hacking out of old putty, which frequently destroys the frames. A new pane of glass can be inserted in two or three minutes by any inexperienced person, the glass being secured by a hinged flap and turn button.

PRICE, with Opaline Reflecting Top, 12s.; with Fluted Glass Top, 10s. 6d.
Also made EXTRA STOUT recommended for its durability.

D. HULETT'S IMPROVED SERVICE CLEANSER,

By the use of which stoppages in service and other pipes are freed from naphthaline and other obstructions in a few minutes. PRICE 73s. net.

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